plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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1961-1962

PLATING MAGAZINE

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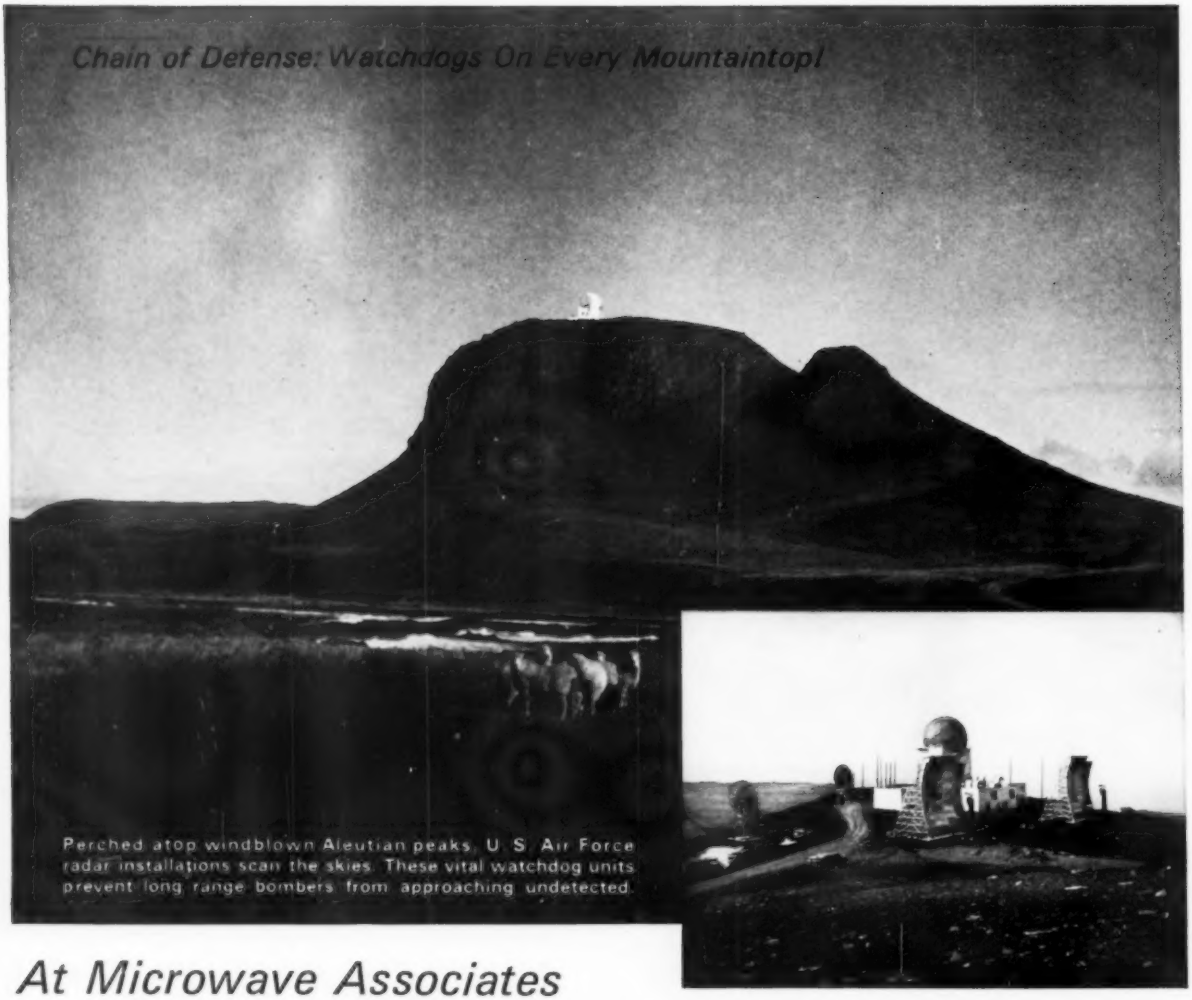
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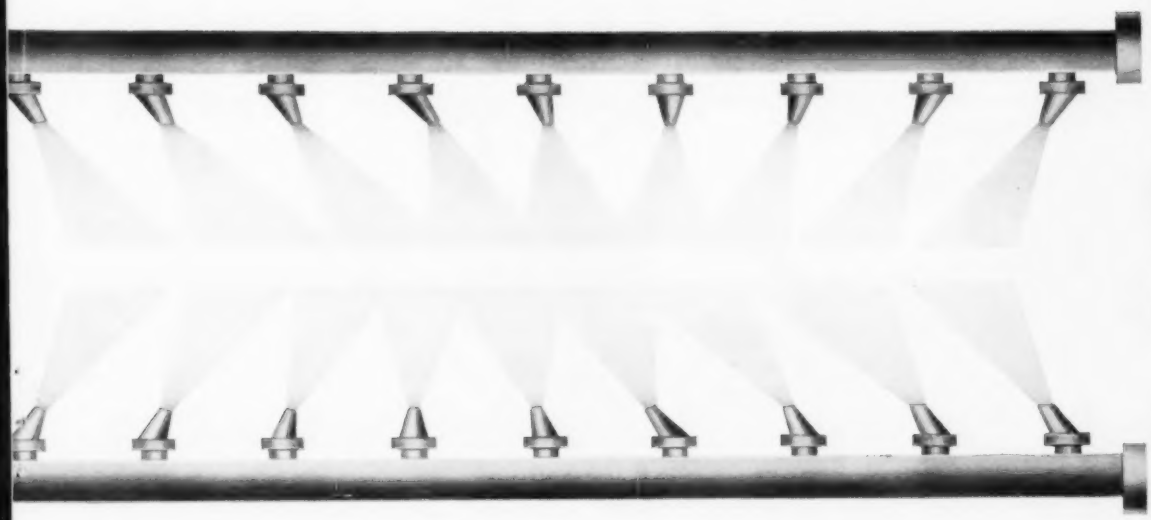

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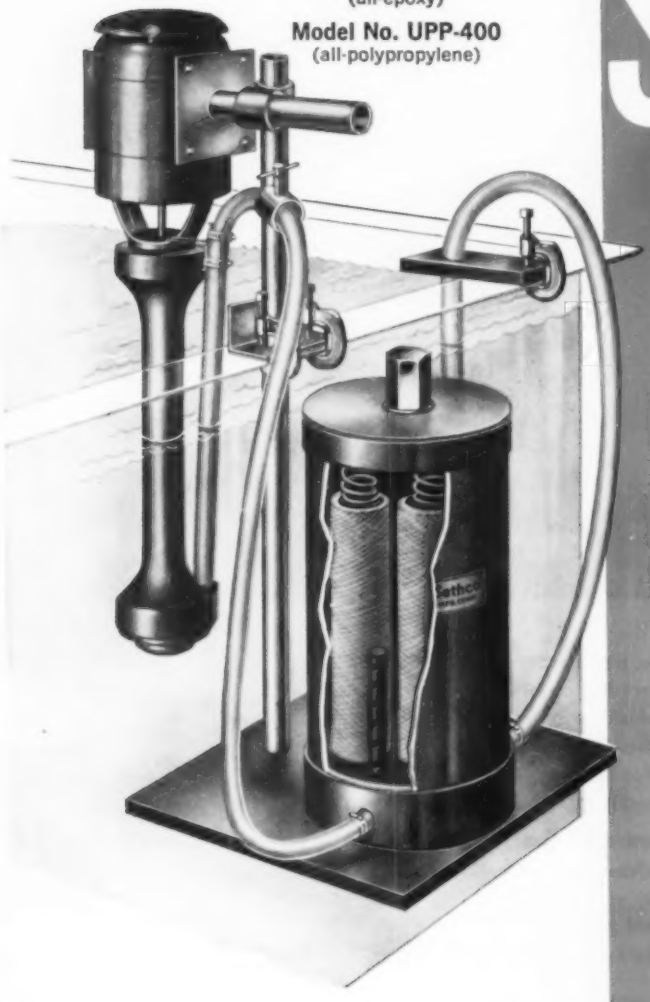

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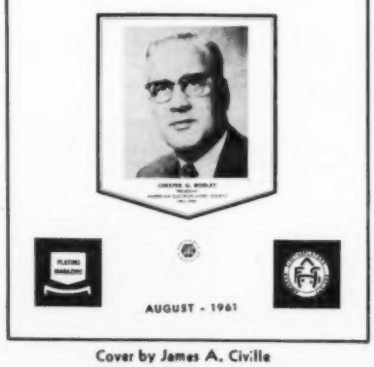

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JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

POST-CONVENTION ISSUE

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HARSHAW

EDITORIAL

WHAT HAPPENS TO YOUR A E S ANNUAL DUES

WHEN I RECEIVED a notice from the Detroit Branch Secretary that my annual membership dues for 1961–62 were due, I wondered how many AES members are aware in what way their annual AES membership dues money is distributed.

The money received by the Branch from membership dues does not remain entirely in the Branch treasury. Each Branch is required by the AES Constitution and Bylaws to remit to the Supreme Society, an annual Per Capita Tax of $7.50 for each active Branch member. The balance of the money from annual Branch membership dues is retained by the Branch to finance regular and, in some instances, regional meetings, plant visitations, and plating courses.

The Per Capita Tax is, in turn, prorated by the National Society thus:

1. One dollar for the AES Research Fund that supports AES's vital Research Program embodying specific Projects in various American and Canadian universities and scientific foundations.
2. Two dollars for annual subscription to the official journal of the Society—PLATING MAGAZINE.
3. The balance of the Per Capita Tax ($4.50) helps finance National Headquarters' operating and publishing expenses, including the cost of publishing the large and invaluable annual book TECHNICAL PROCEEDINGS that each AES member in good standing annually receives as an entitlement of his AES membership.

The AES Research Fund, as stated, sponsors research programs in various universities and research foundations. The status of the Research Program was reviewed by its Chairman in the "Annual Report" published in the June 1961 issue of PLATING, and further expanded at the Boston Convention.

Project No. 12, "Cleaning and Preparation of Metals for Electroplating;" Project No. 14, "The Influence of Physical Metallurgy and Mechanical Processing of the Basis Metal on Electroplating;" and Project No. 16, "The Mechanism of Electrodeposition," are fundamental research projects under the supervision of competent scientists. These projects are not only developing new theories and solutions to present day problems, but also are supporting promising young scientists who are pushing back the frontiers of metal finishing science. It is our moral responsibility to support basic research so that we can build for tomorrow.

Project No. 15, "Accelerated Corrosion Tests for the Performance of Plated Coatings," and Project No. 18, "Mechanical Finishing of Metal Surfaces," are applied research projects. The results obtained thus far from these two programs have been used with success in industry. For example, the CASS and Corrodkote tests were and still are being utilized in research, development, and evaluation of new electroplating processes. As a result of these new processes, the public is slowly reaffirming its faith in electroplated coatings.

I sincerely believe that the one dollar I contribute each year to the Research Fund is one dollar well spent. Do you?

Manuel Ben

First Vice President
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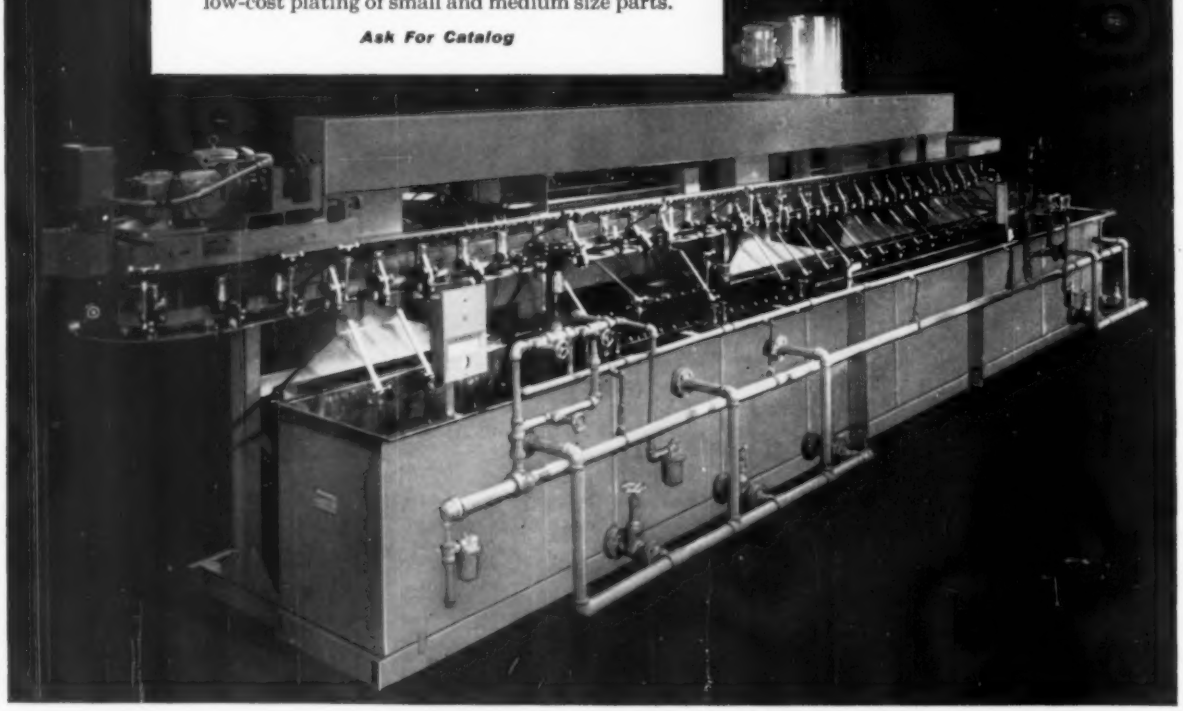

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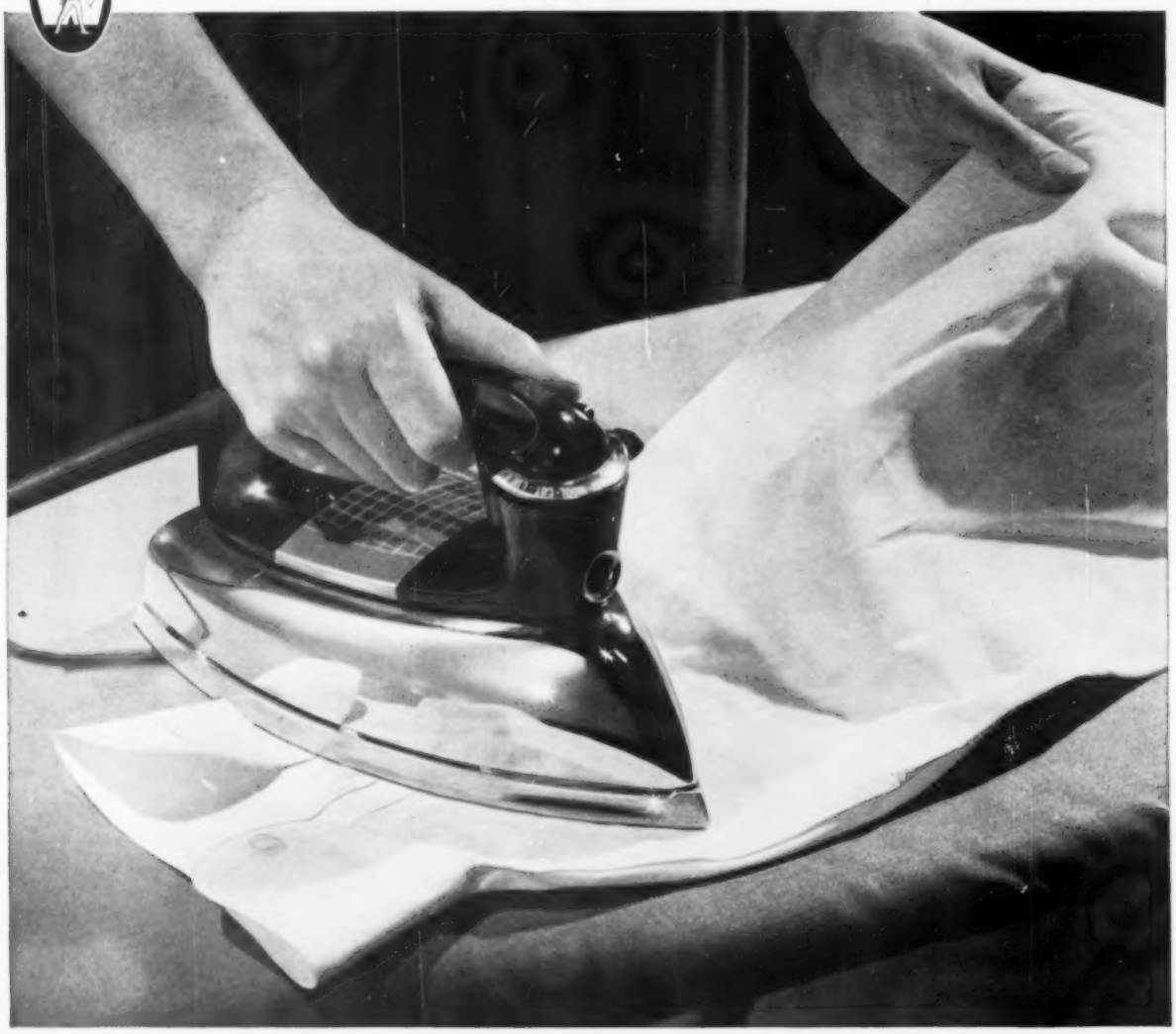

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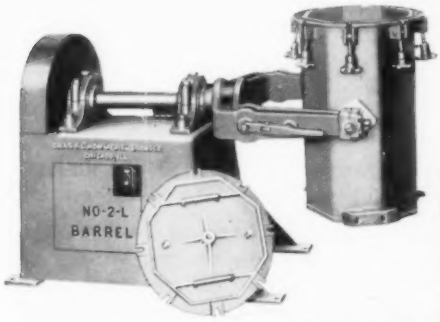

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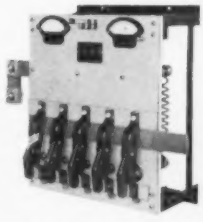

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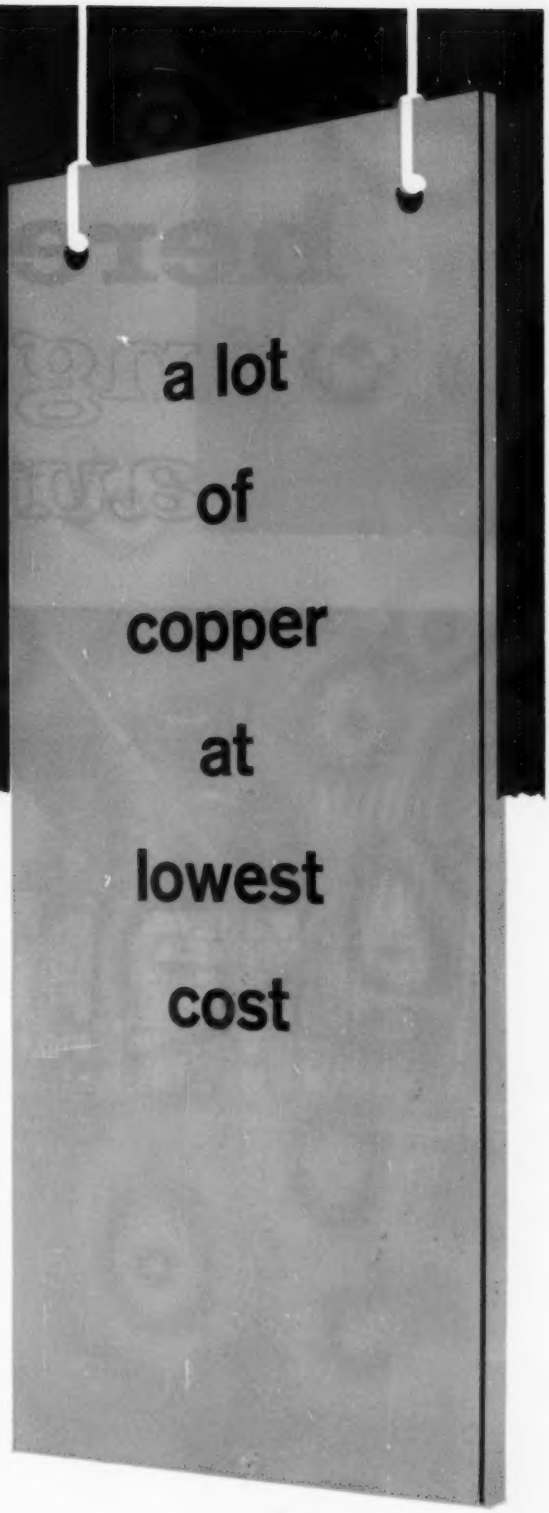

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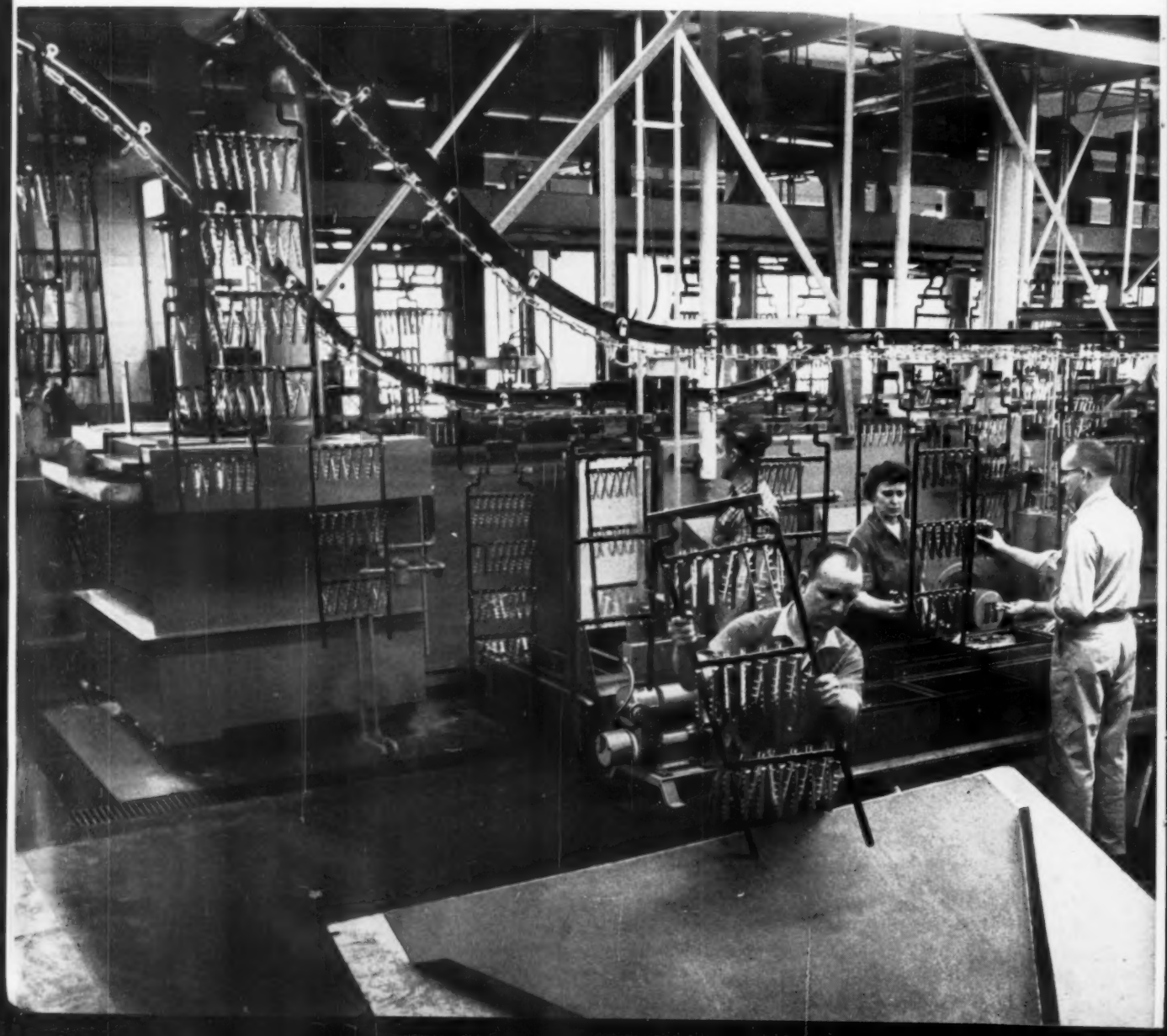

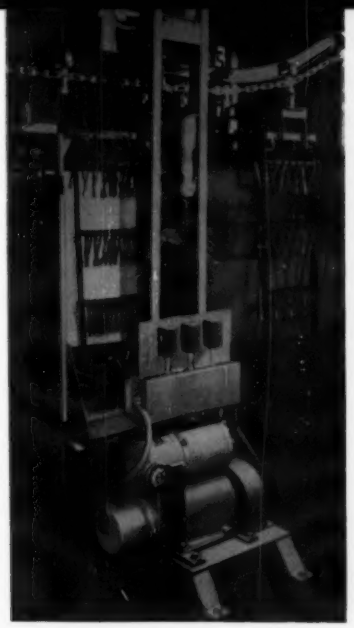

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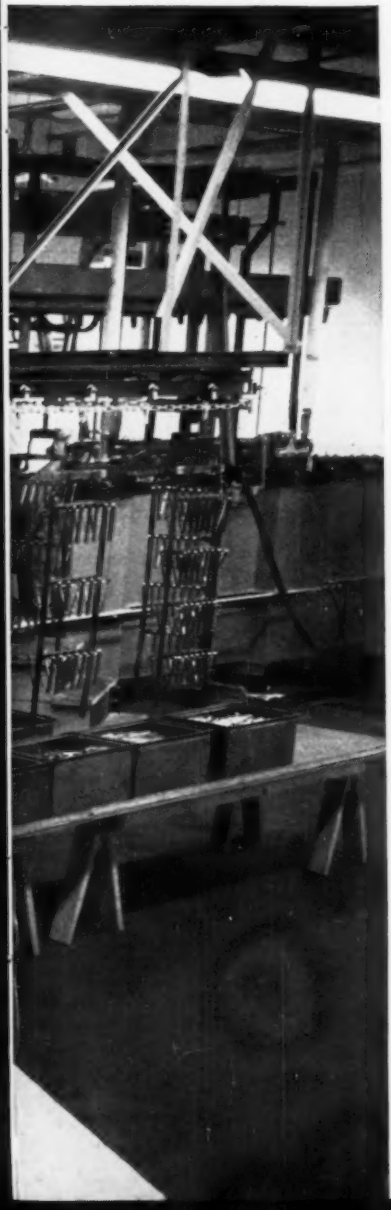

Udylite Cyclemaster ties into plant conveyor system, features automatic rack loading and unloading mechanism

A fully-automatic Udylite Cyclemaster was selected by Koelling Metal Parts, St. Louis, Missouri, to meet high-production, high-quality plating requirements on looseleaf binder and catalog components. This 15-station machine with automatic load and unload mechanism, shown above, is tied directly into a "stop and go" overhead plant conveyor system for maximum material flow efficiency. ■ This Udylite Cyclemaster provides peak production flexibility for Koelling. It operates at any rate from 40 to 120 racks per hour with plating thickness easily varied from .0001" to .001". Parts of any size can be plated within the limits of the 16" x 8" x 36" racks. ■ The Cyclemaster maintains exacting quality control standards, boosts plating volume and offers an important reduction in floor space requirements. To find out how you can obtain the ultimate in automatic plating today at a surprisingly low cost, call your Udylite Representative and have him tell you the complete Cyclemaster story. Then, let Udylite Engineers recommend the specific machine and conveyor system to best meet your requirements.

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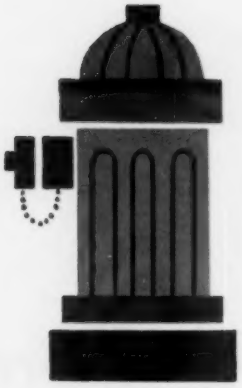

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♦

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♦

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♦

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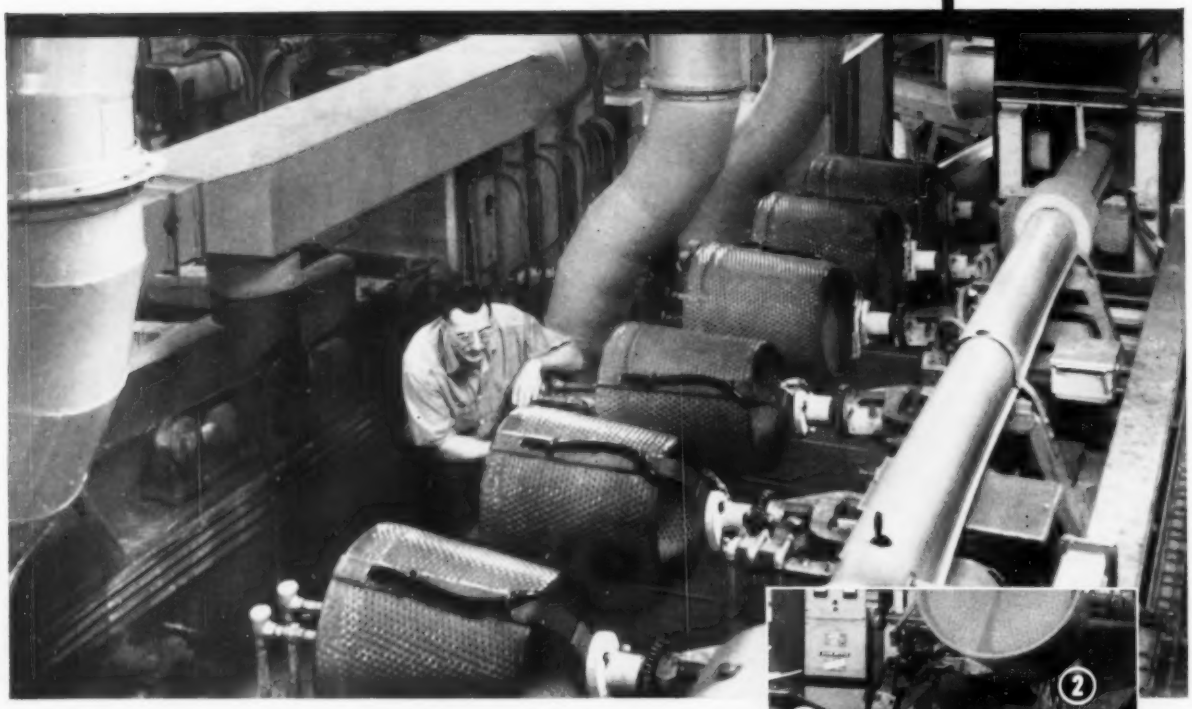

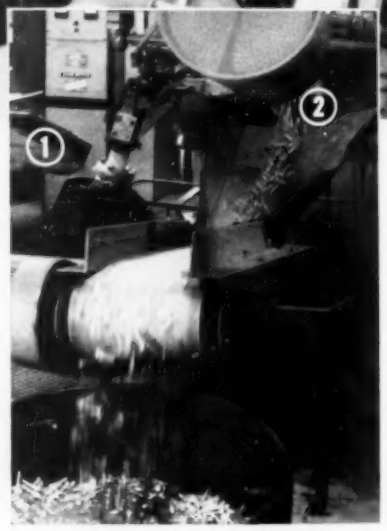

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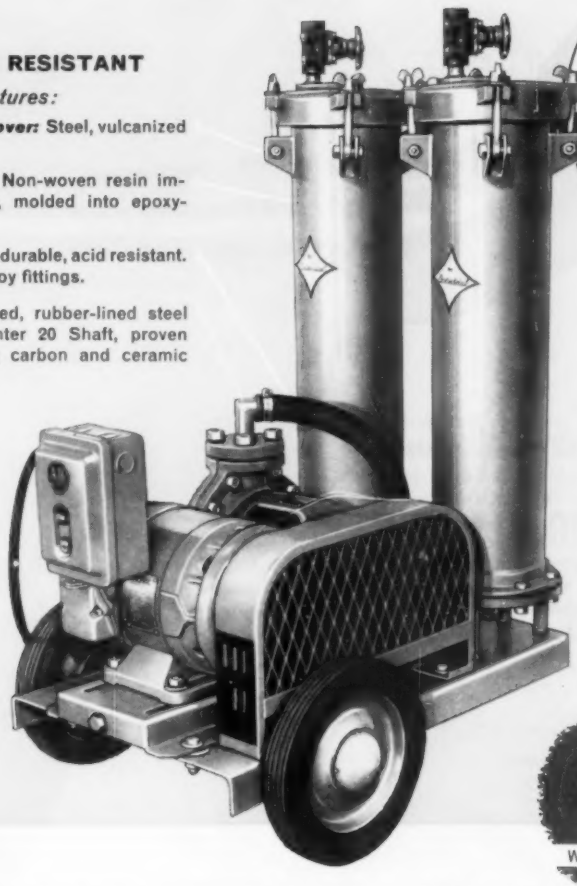

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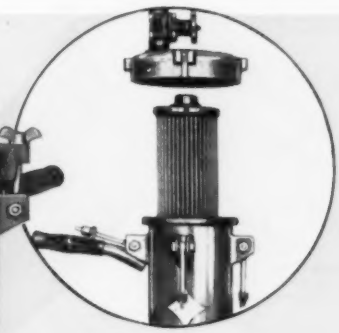

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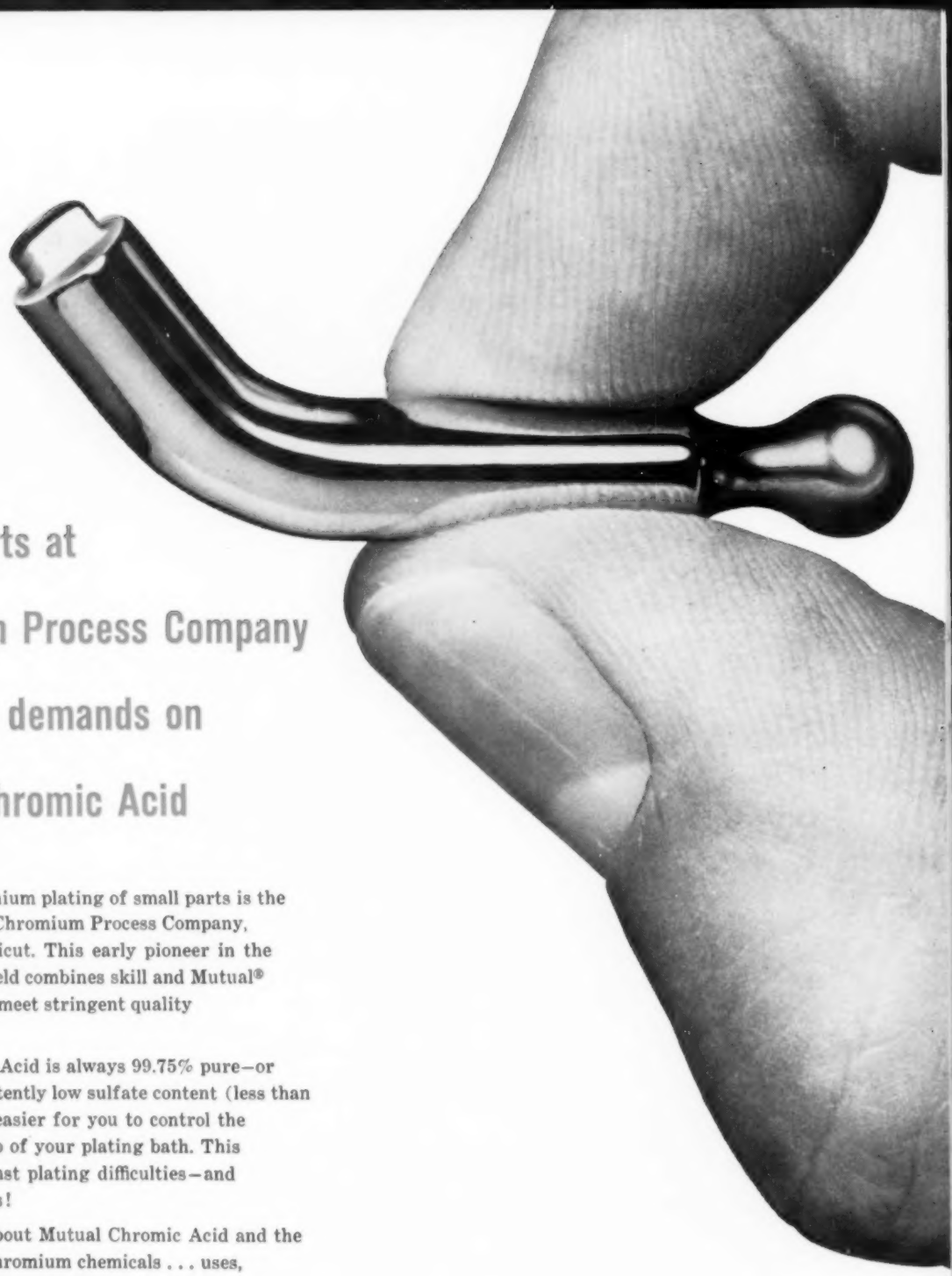

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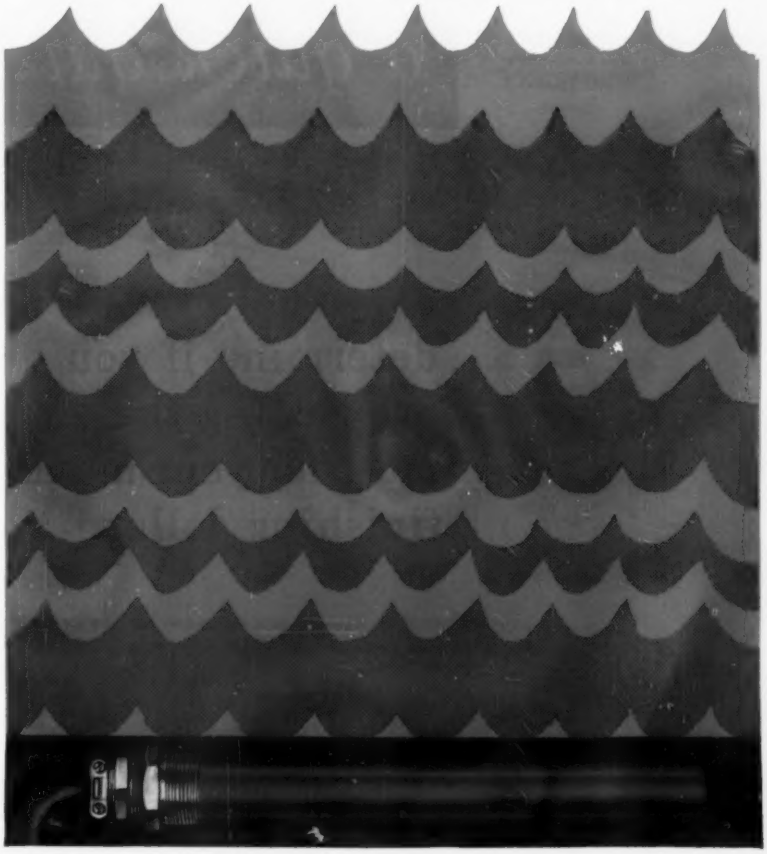

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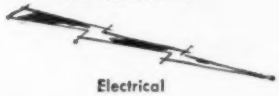
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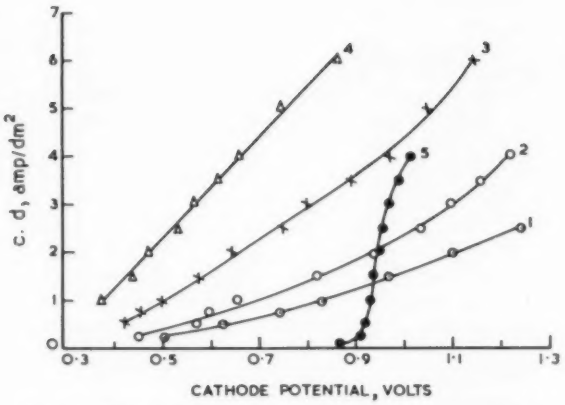

Fig. 1. Cathode Potential Curves for Copper and Tin. Molar ratio of P_2O_7 to metal 2.73, temp. 60C, agitation 1100 rpm, pH 9.0–9.5 throughout unless otherwise stated. (1) Cu 0.02M, (2) Cu 0.04M, (3) Cu 0.10M, (4) Cu 0.15M, (5) Sn 0.20M.

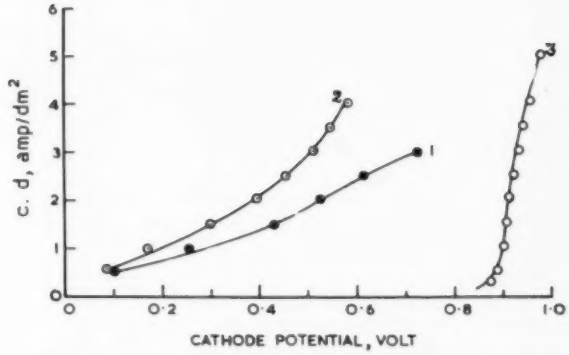

Fig. 2. Cathode Potential Curves for Copper and Tin (with ammonium oxalate). Ammonium oxalate 20 g/l in this as well as the following figures. (1) Cu 0.02M, (2) Cu 0.15M, (3) Sn 0.20M.

ELECTRODEPOSITION OF COPPER-TIN ALLOYS FROM THE PYROPHOSPHATE BATH

by T. L. RAMA CHAR and J. VAID*

ABSTRACT

Copper has been codeposited with tin from the pyrophosphate bath. A detailed study has been made of the effect of the variables on alloy composition, cathode efficiency and cathode potential. The optimum conditions for obtaining satisfactory alloy deposits in the composition range 41 to 95 per cent copper are: composition of solution—copper 9.5, tin 23.7, pyrophosphate 167.0, ammonium oxalate 20 g/l, pH 9.0, 60C, cathode current density 0.5–8.0 amp/dm², cathode efficiency 99–100 per cent. Alloys in the range 10 to 96 per cent copper can be obtained by varying the operating conditions. Sudden phase shifts resulting from small changes of current density, at low current densities, caused sudden changes in plate composition and cathode potential. The following phases were identified by x-ray studies: alpha, gamma plus eta, and eta plus tin.

INTRODUCTION

Alloys of copper and tin have been deposited from stannate-cyanide,[1] stannous pyrophosphate-copper cyanide,[2, 3] oxalate[4] and fluoborate[5] solutions. It has been shown in this laboratory that the pyrophosphate bath is suitable for the plating of copper[6] and tin.[7, 8] The bath has established itself for the industrial plating of copper.[1] The preliminary work on the codeposition of copper with tin from this bath has been briefly reported earlier.[9]

EXPERIMENTAL PROCEDURE

The plating solutions were prepared from sodium pyrophosphate, copper pyrophosphate, stannous pyrophosphate and ammonium oxalate. The pyrophosphates of tin (stannous) and copper (cupric) were prepared by adding sodium pyrophosphate solution to solutions of stannous chloride (in hydrochloric acid and with tin foils under carbon dioxide) and copper sulphate respectively; the precipitate thus formed was washed thoroughly, dried and kept for use. The addition of 20 g/l ammonium oxalate was beneficial from the viewpoint of bath stability and resistivity. The pyrophosphate concentration was in excess of that required for complex formation. The molar ratio of pyrophosphate $(P_2O_7)^{-4}$ to metal was 2.73 unless otherwise stated. Physico-chemical measurements have shown that the metal ion concentration (g ion/l) for the pyrophosphate complexes are of the order of 10^{-9} for copper and 10^{-14} for tin. The plating solution was acidified and copper was precipitated out by iron powder, and the filtrate titrated for tin (stannous) against standard iodine after reduction with antimony powder in carbon dioxide; copper was estimated electrolytically. The pyrophosphate content was determined by the ammonium phosphomolybdate method, and orthophosphate by the method of Kolthoff and Stenger.[10] The deposit was stripped from the cathode with a mixture of 1:1 concentrated nitric acid (sp gr 1.38) and concentrated hydrochloric acid (sp gr 1.17), taken to fumes with concentrated sulphuric acid and analysed for copper as above.

For each experiment, a 175 to 200 ml portion of fresh solution was used. A cylindrical hollow cathode of platinum or other metal (1½ in. high by ⅝ in. diameter) slipped over a stainless steel rod was placed inside a hollow cylindrical

*Electrochemistry Laboratory, Department of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore, India. Present address of Mr. Vaid, Electrical Industries Corporation, Calcutta.

TABLE I

EFFECT OF VARIABLES ON ALLOY DEPOSITION

Variable	Per cent Cu in deposit	Limiting cd	Cathode potential
Fig. No.	3–5	3–5	6–8
Increase in cd	Decrease	—	Increase
Increase in Cu concn. of soln. 0.02, 0.04, 0.07, 0.1, 0.15, 0.2M	Increase	Increase	Decrease
Increase in Sn concn. of soln. 0.15, 0.2, 0.25M	Decrease at higher cd	No change	Increase
Increase in P_2O_7 concn. of soln. ratio 2.23, 2.73, 3.23	Decrease at higher cd	No change	Slight increase
Increase in total metal concn. of soln. 0.2, 0.3, 0.35, 0.4M	Slight increase	No change	Slight decrease
Anode, S. Steel to alloy 55 or 90 per cent Cu	Slight increase	Little change	Variation irregular
Increase in temperature 40, 50, 60, 70, 80C	Increase	Increase	Decrease
Agitation 500, 900, 1100, 1400, 1900 rpm	Little change	—	Slight decrease
Addition agents Sodium nitrate, citrate, β-naphtholate, dextrin	Increase	Little change	Decrease

stainless steel or alloy anode (1 in. high by 1⅝ in. diameter by 1¼ in. thick). The interelectrode distance was ½ in. Most of the work was carried out with a stainless steel anode, since the performance of the alloy anodes was not satisfactory. Some experiments have, however, been carried out with alloy anodes containing 55 and 90 per cent copper, the anode area being four times the cathode area. The plating was carried out with rotating cathodes (1100 rpm), and the time was varied from 10 to 60 minutes.

The cathode efficiency was determined by the usual method for alloys.[1] The Kohlrausch bridge was used for specific resistivity measurements. The *p*H was measured with a glass electrode. Conditions were carefully controlled to obtain electrode potential values (hydrogen scale) to an accuracy of ±0.005 v. The data have, however, been presented to the second decimal place, the sign of the potential being negative throughout unless otherwise stated. A decrease in the cathode potential means that the potential is less negative. The thickness throwing power was measured by using the bent cathode[11] test. Photomicrographs of the surface of a thick coating (0.001 in.) of the deposit were taken with a Vickers projection microscope. X-ray powder patterns of the deposit were obtained with a Siemens, Baujahr 1950 Model X-ray unit and a 57.3 mm diameter camera. Copper Kα radiations with a nickel filter at 25 kv and 20 milliamperes were utilised. Hardness measurements were made on the surface of the deposit with a Leitz 1151 Durimet midget hardness tester.

EXPERIMENTAL RESULTS

Figures 1 and 2 present the cathode potential curves for copper at different concentrations and for tin at the optimum concentration for solutions without and with ammonium oxalate. In the former case the tin curve intersects the copper curves at the lower concentrations. With ammonium oxalate, on the other hand, the curves for the two metals are quite apart, the copper potential becoming more positive. Even then, codeposition takes place. Copper is the nobler of the two metals.

Alloy deposition was carried out under different conditions with respect to electrolyte concentration, addition agents, temperature and agitation. A detailed study was made of

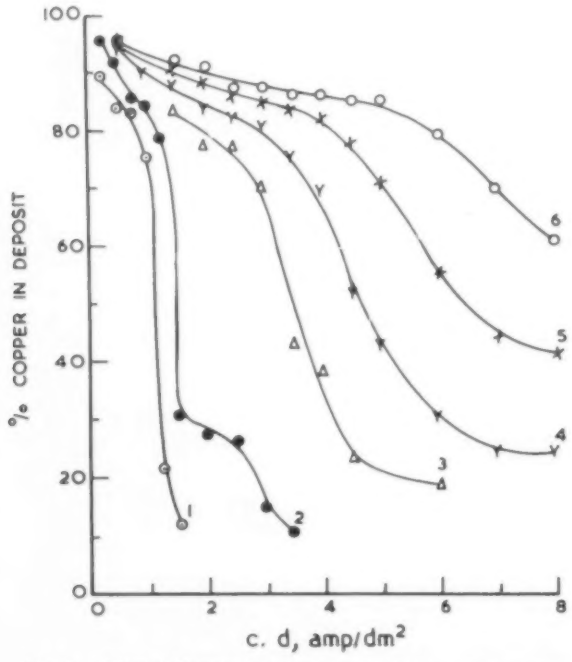

Fig. 3. Effect of Copper Concentration in Solution on Deposit Composition. Anode stainless steel unless otherwise stated. Sn 0.2M, Cu: (1) 0.02M, (2) 0.04M, (3) 0.07M, (4) 0.10M, (5) 0.15M, (6) 0.2M.

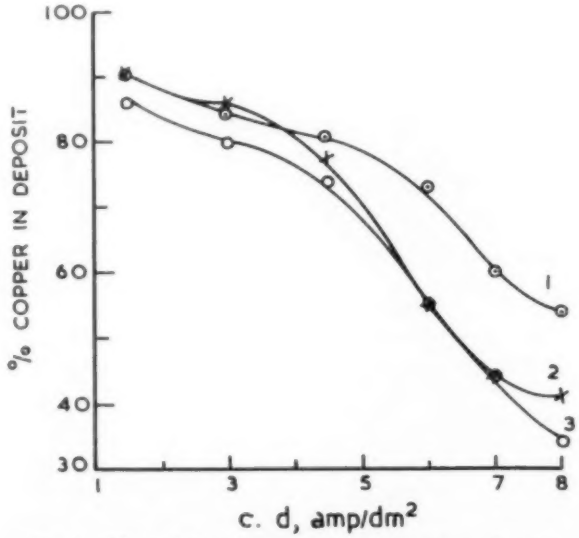

Fig. 4. Effect of Tin Concentration in Solution on Deposit Composition. Cu 0.15M, Sn: (1) 0.15M, (2) 0.20M, (3) 0.25M.

the effect of the variables on plate composition, cathode efficiency and cathode potential. The results have been presented in Figs. 3 to 11, and Tables I to V. Cathode efficiency values have not been given except in Table II, since they are close to 100 per cent under almost all conditions. To avoid overlapping, part of the data obtained are omitted from the figures and tables. The recorded data correspond to good quality deposits. The effect of the variables on alloy deposition is summarized in Table I, and Table II shows the effect of the addition agents.

The bath gives adherent, smooth and fine-grained alloy deposits with 10 to 96 per cent copper, the color ranging from white to yellow to red with an increase in the copper content. The bath is stable under the experimental conditions used. The insoluble anode is quite satisfactory under conditions required to obtain alloys of any desired composition: however, because the metal content of the bath will be gradually depleted, it may be difficult in practice to control the bath composition. It is, however, possible to work the bath with the 90 per cent copper anode under certain conditions (Table III). Ageing up to six months had little effect on the bath performance. Coatings thicker than 0.0005 inch could be obtained. They were resistant to corrosion by the laboratory atmosphere (one to two years) and did not change much in appearance or color. The total metal content was 99.9 to 100 per cent.

Operating Conditions

Table IV gives the operating conditions for obtaining satisfactory deposits over a wide composition range, together with the plating characteristics under optimum conditions for the pyrophosphate and stannate-cyanide baths for copper-tin deposition. The data recorded for the stannate-cyanide bath have been taken from literature[1, 3] and some values which were not available have been experimentally determined. The advantages of the pyrophosphate bath over the stannate-cyanide bath are: (a) higher permissible cathode

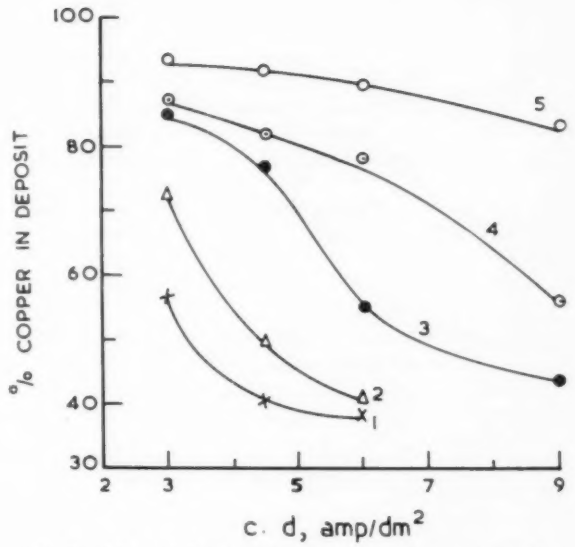

Fig. 5. Effect of Temperature on Deposit Composition. Cu 0.15M, Sn 0.20M, pH 9.0. Temp.: (1) 40C, (2) 50C, (3) 60C, (4) 70C, (5) 80C.

TABLE II

EFFECT OF ADDITION AGENTS ON ALLOY COMPOSITION, CATHODE EFFICIENCY AND CATHODE POTENTIAL

Electrolyte: Cu 0.15M, Sn 0.20M, ammonium oxalate 20 g/l, temp. 60C, pH 9, bath voltage 1-3 volts. In each case the first figure under current density gives the per cent by weight of copper in the deposit, the second the cathode efficiency in per cent, and the third the cathode potential in volts.

Addition agent		cd, amp/dm²							
Compound	Conc. g/l	1	2	3	5	6	7	8	10
Nil	—	90	88	85	77	55	44	41	
		100	100	100	100	100	100	99	
		0.26	0.56	0.64	0.80	0.97	1.01	1.06	
Sodium nitrate	5	88	88	83	80	75	69	53	44
		67	100	100	100	98	99	96	94
		0.22	0.47	0.63	0.73	0.84	0.93	1.07	1.18
Sodium citrate	15	89	88	83	82	77	70	55	45
		66	98	97	94	93	94	92	93
		0.23	0.48	0.63	0.76	0.87	0.99	1.10	1.21
Sodium β-naphtholate	1	90	89	84	82	76	71	66	
		63	100	100	97	94	94	94	
		0.23	0.47	0.63	0.76	0.87	0.93	1.01	
Gelatin	1	86	86	82	75	55	48	44	39
		65	95	95	95	93	91	92	86
		0.22	0.51	0.64	0.89	1.00	1.08	1.18	1.30
Dextrin	1	89	87	83	80	76		73	
		71	100	100	100	100		100	
		0.22	0.52	0.68	0.75	0.86		0.99	

TABLE III
CONTROL EXPERIMENTS

Electrolyte: Cu 0.15M (9.5 g/l), Sn 0.20M (23.7 g/l), ammonium oxalate 20 g/l, temp 60C, pH 9, sp.resistance 7.6 ohm cm, vol of electrolyte 175 ml, anode alloy 90 per cent Cu, anode cd one-fourth of that given below for the cathode. Change in pH, sp.resistance, pyrophosphate and orthophosphate were not appreciable after electrolysis.

cd, amp/dm²	Plating time, mins.	Per cent Cu in deposit	Efficiency per cent		Change in metal concn., g/l	
			Cathode	Anode	Cu	Sn
2	38	87	100	102	+0.07	0
5	33	82	100	90*	−0.03	−1.15

*Calculated on the basis of only copper dissolution.

current density, (b) higher cathode efficiency, (c) lower bath voltage, and (d) easier control and maintenance of bath. The results indicate that the pyrophosphate bath is suitable for the plating of alloys of copper with tin.

DISCUSSION

Alloy Composition

The copper content of the deposit can be increased by an increase in the copper or decrease in the tin concentration of the solution, decrease in the current density, and increase in the temperature (Figs. 3 to 5). The effect of the other variables is not very significant. Sudden jumps occur in both plate composition and cathode potential at certain current densities depending upon the conditions. The addition of sodium nitrate, sodium citrate, sodium beta-naphtholate and dextrin to the plating solution under optimum conditions increases the copper content of the alloy (Table II). The ratio of the concentration of the two metals in the plating solution is quite reasonable. Alloys of any desired composition can be obtained without a drastic alteration of the metal ratio in the solution. An alloy containing 55 per cent copper, the speculum composition, can be obtained from the pyrophosphate bath with a higher ratio of copper to tin in the solution as compared with the stannate-cyanide and stannous pyrophosphate-cyanide baths.[3]

Cathode Efficiency

The cathode efficiencies with which pure tin is deposited from a stannous pyrophosphate solution and copper from a copper pyrophosphate solution are close to 100 per cent under most conditions. The alloy efficiency is also close to 100 per cent (Table II). The cathode efficiency is rather low during deposition of this alloy from stannate-cyanide and stannous pyrophosphate-cyanide baths, the values being 50 to 60, and 50 to 70 per cent respectively.[3] The limiting current density in pyrophosphate solution is increased by an increase in either the copper concentration (in the solution) or the temperature. Under optimum conditions, the limiting current density values for copper, tin and the alloy are 4, 5 and 8 amp/dm² respectively. Codeposition increases the limiting value for both metals. The stannous pyrophosphate-cyanide bath[3] has also been worked at current densities as high as 8 amp/dm².

Cathode Potential

The cathode potential during alloy deposition increased with increase in current density, increase in the tin or decrease in the copper concentration of the solution, and decrease in temperature (Figs. 6 to 8). All the addition agents except gelatin decreased the potential value. The plating solutions

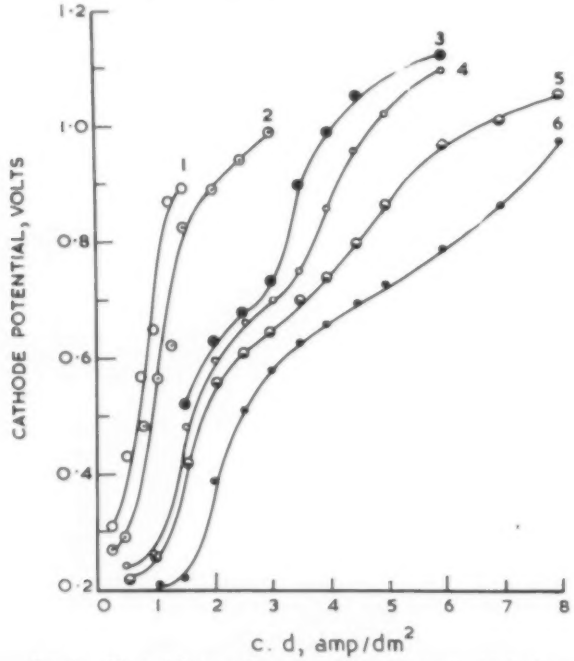

Fig. 6. Effect of Copper Concentration in Solution on Cathode Potential. Conditions same as in Fig. 3.

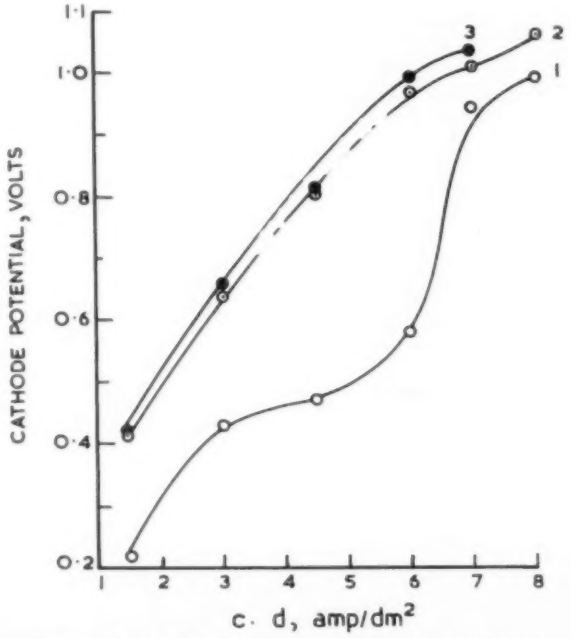

Fig. 7. Effect of Tin Concentration in Solution on Cathode Potential. Conditions same as in Fig. 4.

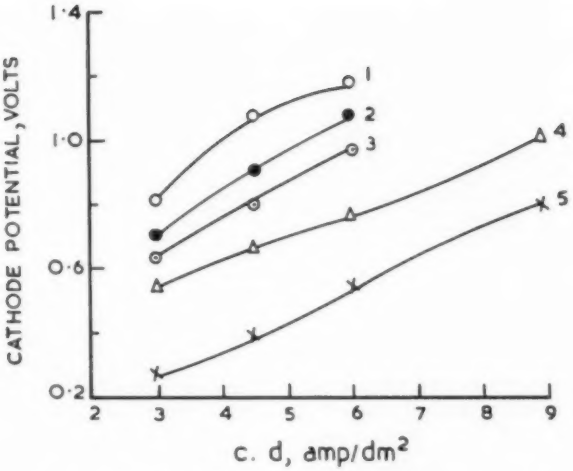

Fig. 8. Effect of Temperature on Cathode Potential. Conditions same as in Fig. 5.

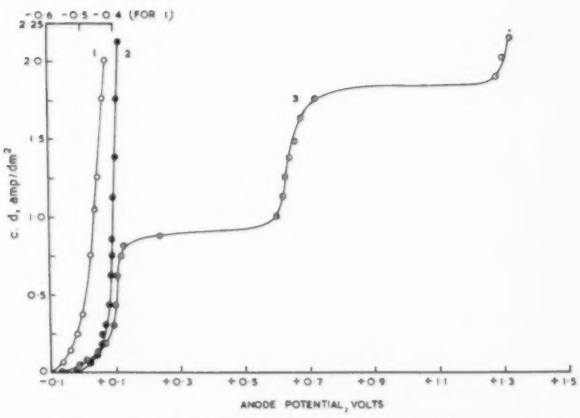

Fig. 9. Anode Potential Curves. Anode cd is given. (1) Sn anode in solution of Sn 0.2M, (2) Cu anode in solution of Cu 0.15M, (3) 90 per cent Cu anode in solution of Cu 0.15M, Sn 0.2M.

possessed good throwing power as observed visually. The distribution of the deposits on bent cathodes[11] was uniform except at the extreme edges. Analysis of the alloy, at points corresponding to the middle of the arms of the bent specimen, indicated uniformity of composition. The deposition potentials for copper, tin and copper-tin alloy in pyrophosphate solutions under optimum conditions are 0.28, 0.82 and 0.19 v respectively. An alloy deposit with a high copper content is to be expected at low current densities, as is borne out by the experimental results.

The sudden changes in plate composition and cathode potential corresponded more or less to the deposition of

TABLE IV
OPERATING CONDITIONS OF COPPER-TIN ALLOY BATHS

	Pyrophosphate		
	Range	Optimum	Stannate-cyanide
Bath composition, g/l			
Copper pyrophosphate	3.8–37.6	28.2	Sodium stannate 100
Stannous pyrophosphate	30.8–51.4	41.1	Copper cyanide 11.5
Pyrophosphate $(P_2O_7)^{-4}$	48.0–189.7 (0.27–1.09M)	167 (0.96M)	Free NaCN 16
			Free NaOH 15
Ammonium oxalate	20	20	Copper 8
Copper	1.3–12.7 (0.02–0.2M)	9.5 (0.15M)	Tin 40
Tin	17.8–29.7 (0.15–0.25M)	23.7 (0.20M)	
*p*H	9.0–9.5	9.0	12
Temperature, °C	40–80	60	65
Sp.resistance, ohm cm	6.5–12.0	7.6	12.6
Bath voltage, v			
Soluble anode	0.4–2.0	0.4–2.0	2–4
Insoluble anode	1.7–3.0	1.0–3.0	
Agitation, rpm	500–1900	1100	slow
Cathode	Pt, Cu, brass, steel		Pt, Cu, brass, steel
Anode	s. steel, alloy 90 per cent Cu		Cu, Sn separate control
Cathode cd, amp/dm²	0.5–10.0	0.5–8.0	2–3
Anode cd, amp/dm²	0.1–2.5 alloy	0.1–2.0 alloy	Cu 0.5–1.0 Sn 1.5–2.0
Cathode efficiency, per cent	91–100	99–100	50–60
Anode efficiency, per cent	—	102	Cu 60–90 Sn 70–90
Cathode potential, v	0.19–1.21	0.22–1.06	1.60–1.75
Deposit			
Composition, per cent Cu	10–96	41–95	55
Hardness, Vickers	143–509–148 (40–95% Cu)	509 (53% Cu)	593 (51% Cu)
Time to deposit 0.001 in., (mins at 3 amp/dm²)	—	32	24

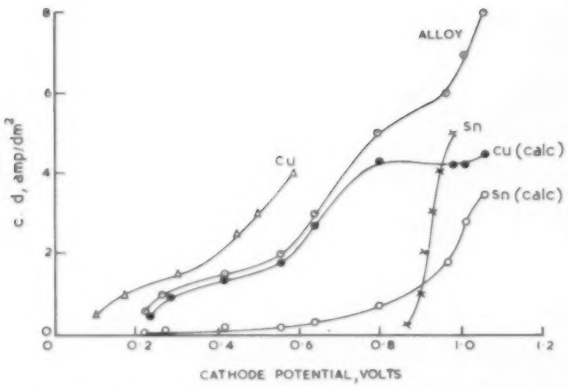

Fig. 10. Reconstruction of Single Metal Potential Curves from Alloy Composition and Potential. Bath composition: Cu 0.15M, Sn 0.2M. Alloy Cu 0.15M, Sn 0.2M.

alloys of different phases from high copper to high tin, namely, alpha, gamma plus eta, and eta plus tin phases. For a small change of 0.2 amp/dm², the composition change was quite sharp, 54 per cent copper, accompanied by a potential jump of 0.22 v. Similar changes in plate composition and cathode potential have been observed during the deposition of different phases in nickel-zinc[12] and iron-zinc[13] alloys from the pyrophosphate bath.

The cathode potential curves (Fig. 2) for copper and tin are far apart. Nevertheless, alloy deposition is possible because of the mutual influence of the two metals. From the alloy potential and composition it is possible to determine the proportion of the current that is used in the deposition of each metal and to plot corresponding potentials for each. Calculation of this nature, wherever possible, will give a fairly quantitative picture of the extent of influence of one metal over the other during alloy plating. Studies of this type have been made in this laboratory for the deposition of alloys of iron with zinc, as well as several others from the pyrophosphate bath.[13] Figure 10 presents the cathode potential curves of the copper-tin system under optimum conditions: alloy potential, single metal potentials—observed and calculated. The alloy curve is closer to the experimental copper curve than the experimental tin curve. The reconstructed curves show that there is a polarization for the deposition of copper, the polarization being greater at higher current densities. In the case of tin there is a small polarization for the deposition after about 1 amp/dm². The relative position of the calculated curves indicates the possibility of codeposition. The alloy curve is closer to the calculated curve for copper, indicating that a deposit with a high copper content is to be expected. This is in agreement with the results.

Structure of Deposits

The photomicrographs in Fig. 11 show that the electrodeposited alloy has a fine-grained structure. X-ray studies of the deposits broadly indicated the existence of alpha, gamma plus eta, and eta plus tin phases (Table V). The compositions corresponding to the phase boundaries for the electrodeposited alloys are somewhat different than those for alloys prepared thermally. The values of the lattice constants for the electrodeposited alloys are in fair agreement with those reported,[11] and also with the values for the alloy electrodeposited from the stannate-cyanide bath. In the gamma plus eta phase, the high copper alloy has a predominant gamma phase, whereas in the low copper alloy the eta phase is

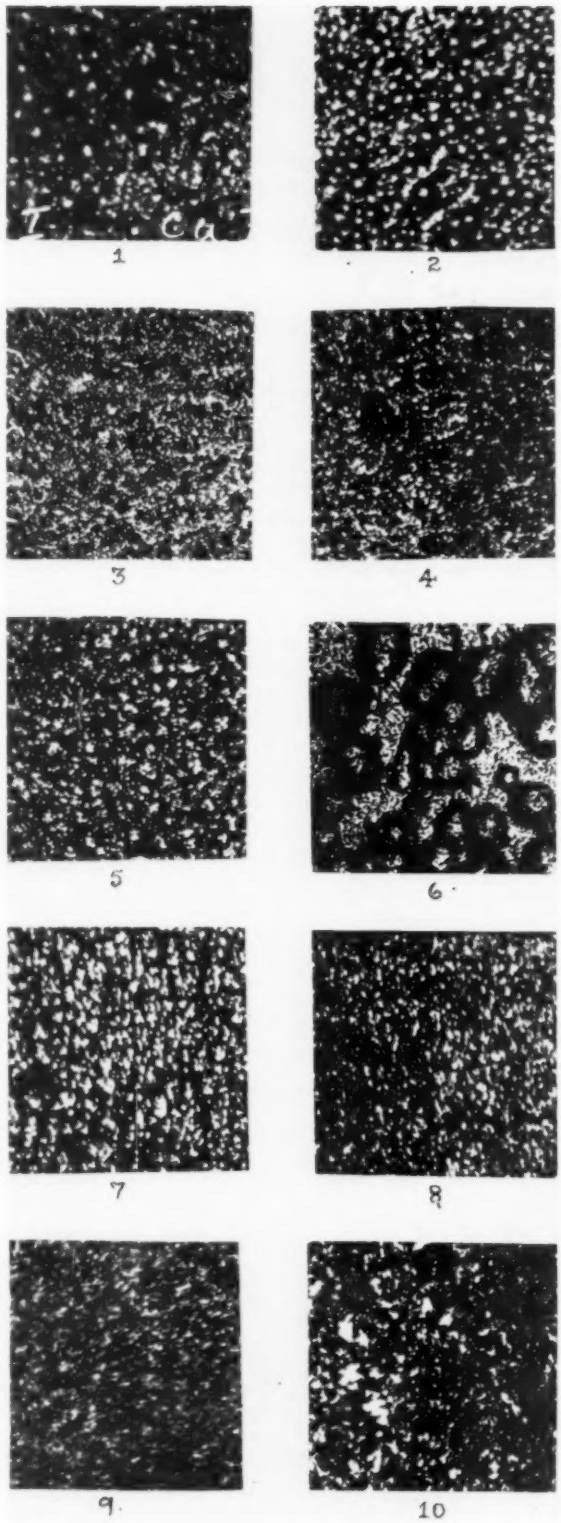

Fig. 11. Photomicrographs of Deposits. Copper base, magnification 1 × 500. Plate 1, Cu only; Plate 2, 94 per cent Cu; Plate 3, 89 per cent Cu; Plate 4, 82 per cent Cu; Plate 5, 53 per cent Cu; Plate 6, 51 per cent Cu (stannate-cyanide bath); Plate 7, 44 per cent Cu; Plate 8, 27 per cent Cu; Plate 9, 26 per cent Cu (stannate-cyanide bath); Plate 10, Sn only.

TABLE V
X-RAY STUDIES

Per cent Cu	Phase	Lattice	Experimental Å a	Experimental Å c	Reported Å a	Reported Å c
Copper only		fcc	3.627		3.620	
90	α	fcc	3.677		3.690	
80	α	fcc	3.675		3.690	
58	$\gamma + \eta$	bcc	2.996			
		+cph	4.230	5.120		
58*	$\epsilon + \eta$	cph	2.770	4.350		
		+cph	4.230	5.120		
54**	$\gamma + \eta$	bcc	2.975		2.990	
		+cph	4.230	5.120	4.230	5.120
42	$\gamma + \eta$	bcc	2.975			
		+cph	4.220	5.120		
21	η + Sn	cph	4.220	5.120		
		+bct	5.840	3.180	5.830	3.180
Tin only		bct	5.840	3.180	5.832	3.181

*Deposit heated at 400C for 3 hours and cooled.
**Stannate-cyanide bath.

dominant. The electrodeposit with 58 per cent copper does not contain the epsilon phase, unlike in the thermal diagram. However, heating the alloy at 400C for three hours and cooling showed the epsilon plus eta structure. This perhaps indicates that the electrodeposited gamma phase is metastable and is transformed to the stable epsilon phase.

Rooksby,[14] in his x-ray studies on speculum deposits from the stannate-cyanide bath, was able to obtain the gamma or gamma plus eta phases, but not the epsilon phase. He has also stated that the former phases are metastable and give the epsilon phase on heat treatment. The lattice constants reported by him agree well with those given in Table V. X-ray studies of the bright plate deposited from the stannous pyrophosphate-cyanide bath[3] revealed that the grain size was less than 10^{-5} cm. Raub and Sautter[15] found that the copper-rich deposits contained cubic face-centered mixed crystals, whereas the speculum composition was a mixture of the metastable delta and eta phases. Further, the delta phase changed to the epsilon phase on heating to 220C. Inagaki[16] has reported only the alpha plus eta, or eta phases in speculum deposits.

Anode Corrosion

Anodes of copper[6] as well as tin[7, 8] corrode satisfactorily in pyrophosphate solutions, the efficiency being close to 100 per cent. The 55 per cent copper anode was totally passive. Figure 9 shows that the 90 per cent copper anode corrodes well up to a current density of about 0.8 amp/dm^2. As the current density is increased tin becomes passive and only copper corrodes normally up to 1.8 amp/dm^2. Thereafter the anode potentials approach those for oxygen evolution and complete passivity sets in. The behavior of this anode at different stages checks well with the control experiments given in Table III. With higher current densities there is a depletion in the tin concentration of the solution after electrolysis due to the passivity of the tin anode. Separate anodes of copper and tin have been used during deposition from stannate-cyanide,[1, 3, 17] oxalate[4] and fluoborate[5] baths. In the stannate-cyanide bath the tin anodes require filming. Alloy anodes have been reported for the stannous pyrophosphate-cyanide bath.[3]

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IRON PLATING*

by ALFRED T. CLARKE**

During World Wars I and II, when copper and nickel were sharply restricted, the electrodeposition of iron was developed as an acceptable substitute. Currently, the expanding electronics industry is calling for coatings of iron because of the special properties peculiar to this metal. There is also evidence that iron may be used to advantage as a substitute for copper as an undercoat for nickel and chromium in the protection of articles made from common steels. It is necessary therefore that platers become familiar with its history, recent technical developments, and the techniques required for successful iron plating. A purpose of this paper is to stimulate interest leading to further research and additional practical applications of iron plating.

THERE IS NO DOUBT that the recent progress in the art of electroplating has been greatly advanced by discussion of its problems, discoveries, and new applications to industry by those interested and actively engaged in it. The great mass of information gathered, classified, and tested-out in production plating shops is fast turning the art into a science; but no matter how scientific it becomes, a good plater will always be an artist.

But why should the plating of iron even be discussed when platers have spent so much time and energy in covering up this metal and its alloys to enhance their appearance and to protect them from corrosion? Have platers not learned that most of the things that could be done with iron in our field can be done more effectively with copper, nickel or chromium? Why then this sudden increase of interest in the subject?

Iron plating has had a long, if not an exciting history. Significant investigations began as early as 1860. During the following four-score years, many salts of iron and many addition agents were tried out under varying conditions of operation; but by 1948, Creighton and Kohler, in the second edition of their book on Electrochemistry, stated that "The original Fisher and Langbein solution appears to give as good results as any other solution thus far developed". The formula for this solution is:

$FeCl_2 \cdot 4H_2O$	40 or (40–60)
$CaCl_2$	45 (20–45)
*p*H 1.0–1.8	Temp 190–195F
CD without agitation	20–80 asf
CD with agitation	Up to 300 asf

The concentrations given for the two ingredients are not critical since in various references the $FeCl_2 \cdot 4H_2O$ is given as 40–60 and the $CaCl_2$ as 20–45. During all the years prior to the 1940's, interest in iron plating rose and fell, seemingly linked to the tightening and loosening of the supply of copper and nickel. Before World War I, it had been used to produce pure iron for scientific purposes and by the Russians particularly to produce electrotypes. During World War I, the Germans used it to replace copper in the driving bands for shells, the production of sheets and tubes by electroforming, and the building up of worn machine parts. After the war, they laid away their useful friend and went back to copper and nickel. World War II again stimulated interest in iron plating as a means of saving the restricted copper and nickel—especially in the field of electrotyping and stereotyping. After the war, interest again waned in direct proportion to the availability of copper and nickel. However, each mounting wave of interest brought with it new small-scale applications which have remained to supplement our limited supply of copper, nickel and chromium. To name a few:

1. The electroforming of molds for rubber, glass, and plastics by the U. S. Rubber Company.
2. The production of iron powder for use in powder metallurgy by the Mellon Institute.
3. The continuing use of iron-backed, nickel-faced intaglio

*Paper presented before the Boston Branch, AES, at the December 1960 meeting.
**General Electric Company, Lynn, Massachusetts.

TABLE I

	1	2	3	4	5	6	7	8	9
Component	Chloride	Sulfate	Chloride Sulfate	Ammonium Sulfate	Manganese Chloride	Electrotyping Baths		Fluoborate	Formate
$FeCl_2 \cdot 4H_2O$	40		4.8		27/66	32	5.6		5.6
$FeSO_4 \cdot 7H_2O$		32	33.0				33.0		40.0
$FeSO_4 \cdot (NH_4)_2SO_4 \cdot 6H_2O$				33/48					
$Fe(BF_4)_2$								30.3	
$CaCl_2$	45								
$MnCl_2 \cdot 4H_2O$					0.04/0.07				
NaCl								1.34	
KCl						24			
NH_4Cl			2.7				2.7		
H_3BO_3									4
NaCOOH									2
$(NH_4)_2SO_4$									2
Gardinol (WA)					0.13				
*p*H	1.0/1.8	2.8/3.5	3.5/5.5	2.8/3.0	1.5/2.5	5.0/5.5	4.5/6.0	3.0/3.4	4.0/4.2
Temperature	190/195	90/150	80/160	75/150	160/220	80/105	100/105	135/145	120/160
C.D.	40/280	40/100	20/100	20/100	50/300	20/50	50/100	20/90	30/40
Agitation	mech	mech	mech	mech	mech	mech	mech	mech	mech
Purification	C & D	C & D	C & D	C & D	C & D	C & D	C & D	C & D	C & D
Filtration	cont.	cont.	cont.	cont.	cont.	cont.	cont.	cont.	cont.

TABLE II

Composition	1	2	3	4	5	6	7	8	9	10	11	12
$FeSO_4 \cdot 7H_2O$	40	40	40	40	40	40	40	40	27	40	80	40
$NiSO_4 \cdot 6H_2O$			6.7	12	33.6	12	.134	.134	4.4	7.5	14	12
$ZnSO_4 \cdot 7H_2O$												94
Saccharin	0.3	0.27	0.4	0.27	0.336	0.27			0.27	0.27	0.27	0.27
Sulf. Coconut Oxy Alcohol	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.0067	0.00134	0.0067	0.0067
p-Toluene Sulfonamide		0.235							0.167	0.235	0.235	
phthalmide							0.134	0.134				
H_3BO_3	4	4		4		4	4	4	2.7	4	8	4
*p*H	2.1	2.2	2.3	2.3	2.3	3.7	2.3	2.3	2.2	2.1	2.2	2.3
Temp. F	160	160	160	130	155	160	130	160	150	150	150	160
Cathode CD	50	50	50	50	50	50	50	50	60	90	60	50
Anode CD	25	30	25	25	25	25	20	20	30	45	30	25
Filtration	cont.	cont.	cont.		cont.				cont.	cont.	cont.	
Fe^{+++}	<0.04	0.013	0.029	<0.04	<0.04	<0.04	<0.04	<0.04	0.02	<0.027	0.02	<0.027
Plate Time (min.)	25	25	25	25	25	25	25	25	20	20	20	25
Per cent Leveling*	50	50	50–58	26	42–50	25	50	50	good	good	good	40–50
Per cent Ni in Plate			3	6	15				3	?	3	

*See text page 880.

plates for the printing of U. S. currency and bonds.

4. The use of iron plated stereotypes for the printing of telephone directories.

By the early 1940's, several iron plating formulae had been developed with certain definite objectives in view. To name the most important, there are the hot chloride (already mentioned), the sulfate, the ammonium sulfate, the mixed chloride-sulfate, the iron manganese, the sulfonate, the fluoborate. The optimum formulae and plating conditions are shown in Table I (1–7). These are the most interesting formulae developed by the 1940's.

With the exception of No. 1, the author will not presume to dwell with authority on the merits of each, since experience has been limited to No. 1. However, in one of the latest books on electroplating, these advantages are given: for the chloride baths, the higher solubility of the chloride permits higher concentrations, higher conductivity, and higher current density than with the sulfate. On the other hand, the sulfate baths can be run at a lower temperature, do not oxidize as readily, and are thus more generally used for building up undersized machine parts. The $FeSO_4$ may be used alone or in combination with other salts such as ammonium, magnesium, or sodium sulfates. Baths 6 and 7 were developed particularly for electrotyping where low temperatures were wanted to protect the low melting waxes used in this process.

During this same period, the iron fluoborate bath appeared on the scene along with other fluoborate baths. As can be seen, it also has the advantage of lower operating temperatures and current densities comparable to the sulfate baths—but not as high as the chloride. The same general precautions hold true for all iron baths; but, in the case of the fluoborate baths, there is the added precaution that silicate containing materials should be avoided—such as glass, asbestos and silica filter aids.

More recently, there has appeared on the market an iron sulfamate. It may be purchased in concentrated solution. It will be interesting to watch the literature for a description of an iron sulfamate bath which shall be comparable in ease of control and excellence of deposits to the increasingly popular nickel sulfamate.

Experience with iron plating at General Electric has been exclusively with No. 1, and, with this bath, successful build up was obtained on more than 100 undersized motor shafts at the rate of up to 0.008 in. per hour. Using the same bath at room temperature, a satisfactory flash plate was obtained on thousands of the copper blanks used in making our high voltage copper oxide rectifier plates which appeared on the market just before copper oxide was replaced by selenium. If iron plating again, I think we would try No. 5 which is reputed to be an improvement on No. 1 giving a finer-grained deposit with the same speed and with less danger of pitting plus the possibility of operating at a lower temperature. But by that time some other iron formulation may have proved more suitable as a result of the present day speed of research development.

The oft recurring wave of interest in iron plating may be explained by considering the properties of iron, as deposited. John Beach, of Battelle Institute, in his article published in the May 1956 issue of PLATING, gives seven factors in its favor, to which three more may be added:

1. It is low in cost and abundant.
2. Iron dissolves well as anode.
3. It can be deposited with selected properties:
   a. Hardness ..... 127–360 Brinell
   b. Tensile Strength ..... 56,000–113,000 psi
   c. Annealed ..... 90 Brinell and 40,000 psi
4. It can be easily plated over and fabricated.
5. It is more corrosion resistant than cast iron and some steels.
6. It has about twice the heat conductivity of cast iron or steel.
7. Nickel, plated on electrodeposited iron, has less intrinsic porosity than nickel on steel.
8. Iron has good magnetic properties.
9. It is deposited in a highly pure state.
10. It can be deposited in powder form where high purity powder is desired.

On the basis of these advantages, it is quite possible that the highly diversified requirements of our rapidly developing technology will at any time require the electrodeposition of iron, and electroplaters should be ready to respond.

In making up the various baths, the regular plater's grade of chemicals is required. Because of the low demand, the iron salts have been hardest to obtain. For some time, the only available iron chloride was a considerably oxidized dihydrate having the appearance of crushed iron ore, with here and there a green crystal of the ferrous salt. To prepare for use, this material should be treated as follows:

1. Dissolve in a minimum of water.
2. Add about a quart of concentrated hydrochloric acid to each ten gallons.
3. Load with scrap iron. This should be in the form of iron or plain steel turnings so as to present a large surface area to the solution.
4. Allow to stand for several days, or until the solution is a clear, dark green.
5. Remove the scrap iron and filter the solution through a suction filter.

This stock solution may be used for make-up and additions. Today, however, the pure green crystals of the tetrahydrate may be purchased in quantity from certain vendors.

In the operation of any iron bath, strict attention must be paid to operating conditions—as in fact with all baths. There are two major problems in iron plating: (1) Pitting and roughness, due in large measure to ferric precipitates and the presence of organic matter, and (2) stressed and brittle deposits, resulting mainly from the wrong *p*H-temperature combination and also presence of organic impurities.

Any one who has plated iron has usually learned the hard way; but for those who have not, it is advisable not to start plating a valuable piece until the following has been performed after making up the bath to the prescribed formula strength:

1. Reduce the ferric iron to less than 0.04 but not less than 0.01 oz/gal. This small concentration helps prevent pitting by its depolarizing action in most baths.
2. Remove all organic matter by carbon treatment only. In this bath, do *not* use H_2O_2 as in nickel baths.
3. Adjust the *p*H to a point just below the hydrolysis *p*H of the iron salts—2.8 for the sulfate and 2.2 for the chloride.
4. Filter the bath thoroughly, taking care to prevent all air seepage into the filtering system.
5. Cover the surface of the bath with a blanket of gum rubber chips or equivalent. This serves as a shield against oxidation of the bath from the oxygen in the air, prevents undue evaporation of the hot solution, and helps to hold a constant temperature.
6. Adjust the temperature and *p*H to the optimum for the particular bath.

With these special precautions, together with adherence to the best standard practices of preparation and handling of the basis metal, a plater is on his way to good, sound iron plating.

This would have been a fitting ending to this discussion in the early forties. But in that decade man's curiosity received a shot in the arm. His scientific horizons were dramatically lifted by a shattering explosion. In the subsequent engineering activity, considerable interest in iron plating was again aroused to meet new engineering needs and to supplement the old copper, nickel, chromium routine and this explains the new wave of interest in Fe plating. As has often happened in the development of other plating baths, new and strange basis metals were submitted for coating—such as aluminum, beryllium, thorium, uranium and zinc. As all these metals were chemically attacked by the chloride and sulfate baths, a new iron plating bath had to be developed. The article by John Beach previously referred to describes some of the efforts made to produce such a bath with results as shown in formula No. 9. It was arrived at after a study of certain nickel baths. A similarity in formulation will be noticed. This bath was found to give satisfactory deposits on basis metals which could not be plated in previous baths.

Currently some new applications of iron plating are being developed in the field of electronics. There is no doubt that many applications of iron plating will develop in this field.

Another development in iron plating might prove to be of interest. It has been noted that when nickel and chromium is deposited on electrolytic iron their resistance to corrosion is considerably improved, due perhaps to a more intimate coverage of the iron by the nickel. This discovery may lead one to suspect that it might be advantageous to substitute iron for copper in our classic copper-nickel-chromium combination. However, since the granular structure of iron becomes coarser with the thickness of deposit, the iron coating would have to be polished and buffed prior to nickel, unless an iron plating formula could be concocted which possessed leveling characteristics and would produce a "bright iron". This posed a challenge which was accepted by some investigators, resulting in patent 2,809,156 issued October 8, 1957, and assigned to the Rockwell Spring & Axle Co. of Coraopolis, Pa. It covers a formula, or series of formulae, claimed to accomplish this very thing. Table II shows 12 different formulae listed in the patent, all of which were evaluated and covered by the patent and its claims.

These formulae are all based on $FeSO_4 \cdot 7H_2O$, some with other metallic additions as nickel and zinc, all with the addition of sulfated coconut alcohol for a wetting agent, and various combinations of saccharin, p-toluene sulfonamide and phthalimide as leveling agents, and boric acid as a buffer. *The data on leveling refer to per cent reduction in roughness measured by a diamond point surface analyzer in terms of rms microinches. All baths required continuous filtration and periodic purification.

The salt spray results on certain samples mentioned in the patent are:

Sample	Iron From	Nickel	Chromium	Salt Spray
1	Bath No. 4	+0.0001 in.	+0.00001 in.	Good after 50 hr
2	Bath No. 5	+0.0001 in.	+0.00001 in.	14–40 hr
3	Bath No. 1	+0.0003 in.	+0.00001 in.	84 hr
4	No iron	+0.0003 in.	+0.00001 in.	49 hr

With these figures, it is easy to arrive at an interpretation of the value of an iron undercoat.

*Refer to footnote in Table II.

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MECHANICAL FINISHING OF METAL SURFACES

I. ZINC BASE DIE CASTINGS

A. Bar Compounds

PART 2

by WILLIAM C. GEISSMAN*, R. SCOTT MODJESKA** and KENNETH GATCHEL*

DISCUSSION OF RESULTS

TEST NO. 1

The first series of tests (Table I) considered the effect of side throw, table speed, wheel pressure and wheel speed in definite predetermined set patterns. The compound was applied in a random fashion as might be done in a normal hand buffing operation, although the amount of compound applied and that left on the wheel was determined and recorded. The amount of metal removed from the piece was also determined by weighing the piece before and after the buffing test. The amperage passing through the motor was also observed.

In this series, a second piece was buffed in identically the same fashion as the first piece except that no buffing compound was added between the two operations. This procedure is not very different from what one may find in actual practice. It was very significant that in no case did the second piece surpass the first and in most cases did not even approach the line removal accomplished on the first piece. In averaging the results of the twenty tests the average for the first piece was 315 GSL and the second piece was 85 GSL removed. It will be noted that in some cases the 100-gram line was not removed and in that instance 50 grams was assigned as the reading. These results show that the amount of compound on the wheel is of great significance and should not be treated as lightly as is done in the normal hand buffing operation and in this first series of tests.

In Table II under the Effect of Table Speed we find the average line removal for five tests at the four levels tested. This table shows that the longer the part is under the buff, the better the line removal. This is something that those close to the buffing operation all recognized as being a fact. Beyond this, it proved the validity of this method of experimentation, since the effect of slowing the table results in a regular straight line.

The effect of side throw or the amount of oscillation of the buff wheel was found to be not significant. This could be expected since the lines whose removal were being measured were at right angles to the direction of buffing. Had the lines been at an angle of 45° or less to the direction of buffing or had the buff been oscillating at a faster rate, greater effects from this factor might have been observed.

Wheel speed, or more correctly stated, the travel speed of the periphery of the wheel expressed as surface feet per minute (SFPM), is an important factor in the buffing operation. Table II shows that the optimum wheel speed is somewhat slower than that commonly used in the trade. However, more work than that represented in this first test is necessary to arrive at the optimum SFPM.

Wheel pressure as demonstrated in Table II is also an important factor in the buffing operation. Increasing the pressure increases the line removal but the maximum was not reached and further study should be made with higher pressures to determine if there is a level where further pressure is detrimental.

There was no correlation between the amount of metal removed from the piece and the gram scratch lines removed. This is very evident by studying Table I and Fig. 10. These data were tested to determine if it would substantiate the theory that metal flows to effect line removal. In the 20 tests the average line removed was the 315-gram scribe line which would correspond to a line 0.00008 inches deep.† This means that 0.281 grams of metal would theoretically have to be removed to correspond with removing a line of this depth. However, the average weight loss was 0.81 grams and in no case was the theoretical weight loss more than the actual loss

†The area of the piece is 16 by 2.5 in. = 40 sq in. 40 sq in. by 0.00008 in. depth of line = 0.0032 cu in. Since approximately 25 per cent of the surface was below the buffed surface we should multiply the volume by 0.75 which equals 0.0024 cu in. The weight in grams equals 0.0024 in. multiplied by 16.38 (factor for converting cubic inches to cubic centimeters) and by 7.14 (the specific gravity for zinc) which equals 0.281 grams.

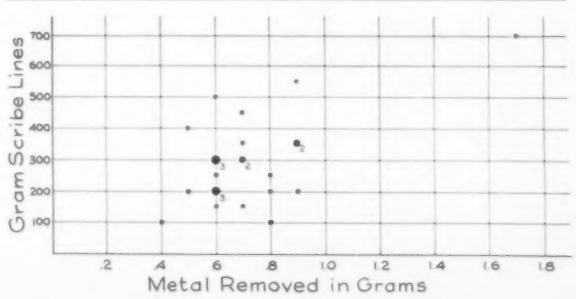

Fig. 10. Relationship between gram scribe lines and weight of metal removed in Buffing Test No. 1.

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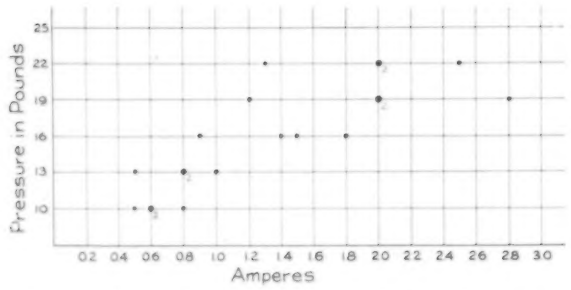


Fig. 11. Relationship between pressure and amperage used by motor in Buffing Test No. 1.

in weight. Had the calculated or theoretical weight loss been more than the actual weight loss substantial proof would be given to the theory that metal does flow during the buffing operation. Needless to say, these data should not be interpreted as proof that the metal does not flow. Although these figures cannot be used to prove the theory of metal flow, they demonstrate that peaks, nodules, burrs or other surface imperfections may be removed during the buffing operation besides the main body of metal.

Figure 11 demonstrates that there is a certain amount of correlation between the amperage flowing through the motor and the pressure on the piece and that the amperage increases as the pressure increases. However, there is hardly enough

TABLE I

BUFFING TEST NO. 1

Conditions: Passes, two cut, one color. Wheel, 16 by 7 in. No. 4, 16 ply, 86/92, 2.50 yd, 1.25 in. A.H., bias buff.

Test No.	Side Throw (in inches)	Table Speed (ft/min)	Wheel Pressure (in pounds)	Wheel Speed (Surface ft/min)	Amount of Compound Applied (in grams)	Amount of Metal Removed (in grams)	Last Gram Scratch Line Removed	Wheel Drag (in Amperes)
1a	0.0	25	10	4402	14.3	1.0	150	0.5
1b	0.0	25	10	4402		0.8	100	
2a	0.0	20	16	5277	22.8	1.0	300	0.9
2b	0.0	20	16	5277		0.8	150	
3a	0.0	10	19	6332	19.5	0.7	550	1.2
3b	0.0	10	19	6332		0.4	100	
4a	0.0	15	13	7384	34.0	0.9	200	1.0
4b	0.0	15	13	7384		0.3	50	
5a	0.25	10	16	4402	19.7	0.7	650	1.4
5b	0.25	10	16	4402		0.3	100	
6a	0.25	15	19	5277	20.5	1.0	500	2.0
6b	0.25	15	19	5277		0.6	150	
7a	0.25	25	22	7384	17.2	0.7	200	2.5
7b	0.25	25	22	7384		0.4	100	
8a	0.25	20	10	8385	24.9	0.2	50	0.6
8b	0.25	20	10	8385		0.1	50	
9a	0.50	25	13	5277	16.6	0.7	50	0.5
9b	0.50	25	13	5277		0.6	50	
10a	0.50	20	22	6332	9.4	0.9	400	2.0
10b	0.50	20	22	6332		0.9	150	
11a	0.50	10	10	7384	27.5	0.5	300	0.8
11b	0.50	10	10	7384		0.7	50	
12a	0.50	15	16	8385	21.4	0.6	300	1.5
12b	0.50	15	16	8385		0.4	50	
13a	0.75	20	13	4402	14.2	1.2	150	0.8
13b	0.75	20	13	4402		1.2	100	
14a	0.75	10	22	5277	19.7	1.1	650	1.3
14b	0.75	10	22	5277		0.6	100	
15a	0.75	15	10	6332	28.0	0.7	100	0.6
15b	0.75	15	10	6332		0.6	50	
16a	0.75	25	19	8385	27.1	0.4	100	2.8
16b	0.75	25	19	8385		0.4	50	
17a	1.00	15	22	4402	13.7	1.7	600	2.0
17b	1.00	15	22	4402		1.4	150	
18a	1.00	25	16	6332	9.2	0.6	300	1.8
18b	1.00	25	16	6332		0.9	50	
19a	1.00	20	19	7384	26.4	0.9	450	2.0
19b	1.00	20	19	7384		0.9	50	
20a	1.00	10	13	8385	19.6	0.6	250	0.8
20b	1.00	10	13	8385		0.2	50	

TABLE II

AVERAGE GRAM SCRATCH LINES REMOVED FOR FOUR TESTS AT EACH NOTED LEVEL OF THE INDIVIDUAL VARIABLES AS FOUND IN BUFFING TEST NO. 1

EFFECT OF TABLE SPEED

Ft/Min	25	20	15	10
Gram lines	150	270	340	480

EFFECT OF SIDE THROW

Side throw in inches	0.0	0.25	0.50	0.75	1.00
Gram scratch lines	300	350	250	250	400

EFFECT OF WHEEL SPEED

SFPM	4402	5277	6332	7384	8385
Gram scratch lines	387	362	337	277	175

EFFECT OF WHEEL PRESSURE

Pressure in lb	10	13	16	19	22
Gram scratch lines	150	150	387	400	462

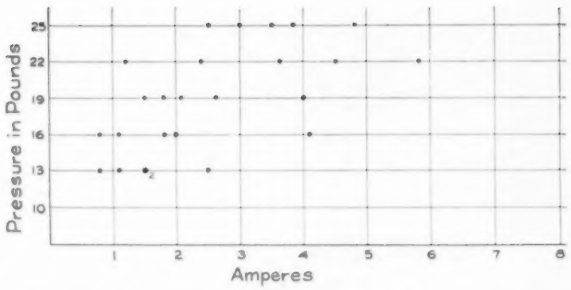


Fig. 12. Relationship between pressure and amperage used by motor in Buffing Test No. 2.

correlation to permit the pressure to be regulated by controlling the amperage in the motor alone. This is logical since the torque or amperage in the motor is a measure of the coefficient of friction between the buff and the piece which is influenced by the pressure, kind of wheel, kind and amount of compound, speed of the wheel and roughness of the piece.

The following observations made in this block of tests and in the other blocks are worthy of note at this time. First, if one of the three like gram scribe lines were erased, the other two would also be obliterated. Second, if, for example,

TABLE III

BUFFING TEST NO. 2

Conditions: Table speed, 15 ft/min; passes, two cut, one color. Wheel, 16 by 7 in. No. 4, 16 ply, 86/92, 2.50 yd, 1.25 in. A.H. bias buff.

Test	Wheel pressure in pounds	Wheel speed SFPM	Amount of Compound applied in grams	Metal removed in grams	Last scratch line removed	Wheel drag in amperes
1	13	3682	33.7	0.6	500	1.1
2	22	4860	23.2	0.7	450	2.4
3	22	6034	10.2	0.6	150	3.6
4	25	7212	21.9	0.9	200	3.5
5	25	8385	10.2	0.6	200	4.8
6	22	3682	32.6	0.5	400	1.2
7	25	4860	29.5	1.7	700	3.8
8	25	6034	21.0	0.9	550	3.0
9	19	7212	11.6	0.6	300	2.6
10	19	8385	20.9	0.8	200	4.0
11	25	3682	11.0	0.7	350	2.5
12	19	6034	10.5	0.6	300	1.8
13	16	8385	10.0	0.7	150	2.0
14	19	3682	20.9	0.7	350	1.5
15	19	4860	31.0	0.9	650	2.1
16	16	6034	30.0	0.5	150	1.8
17	16	7212	30.2	0.8	250	4.2
18	13	8385	30.6	0.6	100	2.5
19	16	3682	10.6	0.8	250	0.8
20	16	4860	20.0	0.6	250	1.1
21	13	6034	20.1	0.6	100	1.5
22	13	7212	20.0	0.4	50	1.5
23	22	8385	20.1	0.9	200	5.8
24	13	4860	9.9	0.7	50	0.8
25	22	7212	30.3	0.6	400	4.5

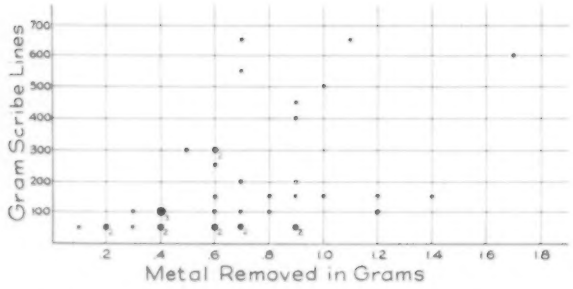


Fig. 13. Relationship between gram scribe lines and weight of metal removed in Buffing Test No. 2.

the set of 400-gram scribe lines were removed, then all the shallower lines would be removed and all the deeper lines would remain. These observations support the validity of the methods used.

TEST NO. 2

The second buffing test (Table III) was carried out with a table speed of 15 feet per minute for all tests, and the factor of side throw was not considered, thus two variables were eliminated. The table speed chosen was in the middle of the range used in Test No. 1 and is commonly used in industry. The factor of side throw was discarded or disregarded because of the lack of correlation between this factor and line removal as shown in Test No. 1. The buffing compound was applied to the wheel prior to buffing and at quantity levels of 10, 20 and 30 grams. Thus we had nine tests with 20 grams and eight with 10 and 30 grams. These results were averaged as before, and it is quite evident from Table IV that an increase in the amount of compound applied increases the line removal by quite a significant amount. However, this test does not show whether the optimum amount of compound has been applied or whether it has been applied properly.

TABLE IV

AVERAGE GRAM SCRATCH LINES REMOVED FOR FIVE TESTS AT EACH NOTED LEVEL OF THE INDIVIDUAL VARIABLES AS FOUND IN BUFFING TEST NO. 2

EFFECT OF WHEEL SPEED

SFPM	3682	4860	6034	7212	8385
Gram scratch lines	370	420	250	240	170

EFFECT OF WHEEL PRESSURE

Pressure in pounds	13	16	19	22	25
Gram scratch lines	160	210	360	320	400

EFFECT OF THE AMOUNT OF BUFFING COMPOUND

Compound applied in grams	10	20	30
Gram scratch lines	219	261	364

TABLE V

BUFFING TEST NO. 3

Conditions: Table speed, 16 ft/min; passes, two cut, one color. Wheel, 15 by 7 in., No. 4, 16 ply, 86/92, 2.50 yd, 1.25 in. A.H. bias buff.

Test	Wheel pressure in pounds	Wheel speed SFPM	Compound applied in grams	Last scratch line removed
1	19	3500	40.0	350
2	28	4000	29.9	650
3	28	4500	20.0	500
4	31	5000	30.1	600
5	31	5500	20.1	250
6	28	3500	39.8	550
7	31	4000	40.0	650
8	31	4500	30.0	700
9	25	5000	20.0	250
10	25	5500	30.5	550
11	31	3500	20.0	300
12	25	4000	40.3	500
13	25	4500	20.4	550
14	28	5000	40.0	700
15	22	5500	19.4	200
16	22	3500	20.1	150
17	22	4000	30.0	300
18	22	4500	40.4	500
19	22	5000	40.2	650
20	19	5500	39.4	350
21	25	3500	30.0	350
22	19	4000	19.8	400
23	19	4500	30.6	550
24	19	5000	30.1	700
25	28	5500	30.0	550
2a	28	4000	30.0	650
2b	28	4000	30.8	650
2c	28	4000	30.0	650
5a	31	5500	20.5	150
5b	31	5500	20.0	150
5c	31	5500	20.1	100
6a	28	3500	40.0	650
6b	28	3500	40.0	650
6c	28	3500	41.1	700
14a	28	5000	40.4	700
14b	28	5000	40.0	500
14c	28	5000	40.9	500
20a	19	5500	31.5	200
20b	19	5500	30.4	200
20c	19	5500	30.3	150
24a	19	5000	30.0	500
24b	19	5000	30.4	500
24c	19	5000	30.7	450

Pressures used in this test were at a higher level, but the three pound increase was not enough to bring us to either the ultimate pressure that could be used or the optimum pressure. The data given in Table IV demonstrate that the optimum wheel speed lies between 6000 SFPM and 3500 SFPM. Further work is needed to narrow down the limits to a more useful figure.

Figure 12 demonstrates again that there is a certain amount of correlation between the amperage flowing through the motor and the pressure on the piece. Again, there is not enough correlation to permit regulating the pressure by controlling the amperage in the motor.

Figure 13 shows that there is no relationship between the line removal and the amount of metal removed from the piece. There will be no further measurements of this relationship in the work of the project.

TABLE VI

AVERAGE GRAM SCRATCH LINES REMOVED FOR THE FIVE TESTS AT EACH NOTED LEVEL OF THE INDIVIDUAL VARIABLES AS FOUND IN BUFFINGS TESTS NO. 3, 4 AND 5

	Test No. 4 16 × 5 No. 1 Wheel	Test No. 3 16 × 7 No. 4 Wheel	Test No. 5 16 × 9 No. 10 Wheel
EFFECT OF WHEEL SPEED			
	Gram Scratch Lines	Gram Scratch Lines	Gram Scratch Lines
SFPM	Removed	Removed	Removed
3500	420	360	460
4000	520	490	490
4500	410	560	500
5000	560	510	430
5500	500	330	330
EFFECT OF WHEEL PRESSURE			
Wheel Pressure in Pounds	Gram Scratch Lines Removed	Gram Scratch Lines Removed	Gram Scratch Lines Removed
19	360	400	350
22	440	360	350
25	530	440	490
28	530	580	490
31	550	480	530
EFFECT OF BUFFING COMPOUND			
Buffing Compound Applied in Grams	Gram Scratch Lines Removed	Gram Scratch Lines Removed	Gram Scratch Lines Removed
20	463	310	375
30	463	530	450
40	517	510	490
Average of Each of the Buffing Tests	482	462	442

TABLE VII

DUPLICATION OF A PORTION OF BUFFING TEST NO. 3 USING SIX DIFFERENT WHEELS AS NOTED

Test	Wheel Pressure in Pounds	Wheel Speed SFPM	Compound Applied in Grams	Wheel 16 by 5 No. 1 Gram Scratch Lines Removed	Wheel 16 by 5 No. 4 Gram Scratch Lines Removed
6d	28	3500	40.0	450	650
11d	31	3500	20.0	250	550
13d	25	4500	20.0	450	400
15d	22	5500	20.0	250	400
22d	19	4000	20.0	350	500
24d	19	5000	30.0	350	600

Test	Wheel 16 by 7 No. 1	Wheel 16 by 7 No. 8	Wheel 16 by 9 No. 4	Wheel 16 by 9 No. 10
	Gram Scratch Lines Removed			
6d	300	500	500	750
11d	300	250	400	650
13d	350	500	250	400
15d	250	250	350	450
22d	250	200	100	250
24d	350	400	150	200

TABLE VIII

BUFFING TEST NO. 4

Conditions: Table speed, 15 ft/min; passes, two cut, one color. Wheel, 16 by 5, No. 1, 16 ply, 86/92, 2.50 yd, 1.25 in. AH, close face bias buff.

Test	Wheel Pressure in Pounds	Wheel Speed SFPM	Compound Applied in Grams	Last Scratch Line Removed
1	19	3500	40.5	150
2	28	4000	30.7	550
3	28	4500	20.0	400
4	31	5000	31.0	800
5	31	5500	21.9	450
6	28	3500	44.0	600
7	31	4000	41.8	650
8	31	4500	31.1	300
9	25	5000	20.4	400
10	25	5500	20.6	650
11	31	3500	20.1	550
12	25	4000	40.6	550
13	25	4500	40.1	650
14	28	5000	40.0	650
15	22	5500	24.2	450
16	22	3500	20.7	400
17	22	4000	30.9	450
18	22	4500	40.8	400
19	22	5000	40.4	500
20	19	5500	41.5	500
21	25	3500	30.7	400
22	19	4000	20.1	400
23	19	4500	33.2	300
24	19	5000	30.0	450
25	28	5500	30.9	450

TEST NO. 3

In the third test (Table V) the pressure was varied from 19 to 31 pounds in three-pound increments, and it is shown by Table VI that the effect of pressure diminishes as it is increased beyond 25 pounds and a point of diminishing returns is being approached. The optimum pressure can only be determined for a specific job, if all these factors are taken into consideration.

The limits of the wheel speed factor were moved closer together as shown in Table VI. It appears that the optimum speed lies somewhere between 4000 and 5000 SFPM. This is within practical limits and 4500 SFPM plus or minus 500 SFPM would be a workable control point. Incidentally this speed is somewhat slower than that used in general practice but this has been reported earlier[1] and is being used by some shops.

Increasing the amount of buffing compound continued to increase the amount of "cut" obtained, but again, we are approaching a point where the addition of more compound does not make for a substantial gain.

At the conclusion of these tests, six of the tests were repeated in triplicate to again verify the precision of this method of experimentation. Table V shows a good agreement with the results obtained in Test No. 3 and is within the limits of experimental error for work of this type.

Also at the conclusion of Test No. 3, a number of tests were duplicated but used different kinds of wheels as noted in Table VII. It is quite evident that the data was too meager to enable any conclusions to be drawn. It was deemed advisable to repeat Test No. 3 with the softest wheel (the 16 by 5 No. 1 wheel) and the hardest wheel (the 16 by 9 No. 10 wheel).

TABLE IX

BUFFING TEST NO. 5

Conditions: Table speed, 15 ft/min; passes, two cut, one color. Wheel, 16 by 9, No. 10, 16 ply, 86/92, 2.50 yd, 1.25 in. A.H., close face bias buff.
86/92, 2.50 yd, 1.25 in. A.H., close face

Test	Wheel Pressure in Pounds	Wheel Speed SFPM	Compound Applied in Grams	Last Scratch Line Removed
1	19	3500	40.9	250
2	28	4000	31.3	400
3	28	4500	20.0	350
4	31	5000	30.5	350
5	31	5500	20.1	400
6	28	3500	40.1	650
7	31	4000	42.5	700
8	31	4500	30.8	650
9	25	5000	20.6	350
10	25	5500	20.8	250
11	31	3500	22.6	550
12	25	4000	40.7	600
13	25	4500	40.0	800
14	28	5000	40.1	550
15	22	5500	20.5	300
16	22	3500	20.4	400
17	22	4000	30.6	350
18	22	4500	40.0	300
19	22	5000	41.1	400
20	19	5500	40.1	200
21	25	3500	30.0	450
22	19	4000	20.1	400
23	19	4500	31.0	400
24	19	5000	30.0	500
25	28	5500	30.4	500

TABLE X

AVERAGE GRAM SCRATCH LINE REMOVED IN BUFFING TEST NOS. 3, 4 AND 5, FOR THE FIVE LEVELS OF WHEEL SPEED

Wheel Speed SFPM	Gram Scratch Line Removed
3500	413
4000	500
4500	490
5000	500
5500	387

TESTS NOS. 4 AND 5

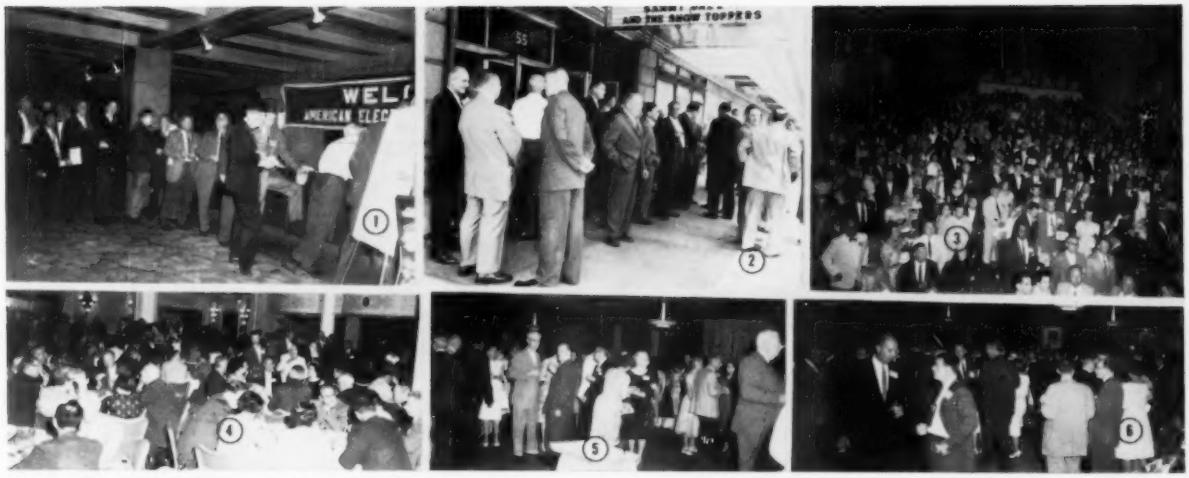
The same procedure and conditions were used in these blocks of tests as were used in Test No. 3 with the exception that Test No. 4 used a 16 by 5 No. 1 wheel and Test No. 5 used a 16 by 9 No. 10 wheel. The results of these tests are tabulated in Tables VIII and IX.

Again the optimum wheel speed lies somewhere within limits of 4000 to 5000 SFPM, although at 4500 SFPM with the 16 by 5 No. 1 wheel we find a rather sharp dip. Some of these tests were repeated, and no significant differences could be found. However, if all of the readings for the three different wheels are averaged, as is done in Table X, it can be seen that the optimum speed for any wheel should be within the limits mentioned above.

Increasing the amount of buffing compound increased the amount of cut obtained, but a point is approached where the addition of more compound does not make for a substantial gain. The overall averages show a remarkable degree of agreement as is shown in Table VI. However, the softer wheels seem to do a better job than the harder buffs and generally leave the work with a much better appearance. To stretch a point, the hard wheels act more like polishing wheels and the soft wheels like buffing wheels. Nevertheless, we must not lose sight of the fact that economics can enter the picture and the soft wheels tear up much faster than the harder buffs.

At the conclusion of these tests some preliminary work was done in which one-half of the compound was applied before each cut pass. In all instances, using compound weights of 20, 30 and 40 grams, a very fine job of buffing was obtained, and all of the gram scratch lines were removed. This led to the conclusion that more work was needed to determine the proper method of compound application.

(To be Continued)



(1) AES members on line to register for the 48th Annual Convention at Boston. (2) Electroplaters chat outside Statler-Hilton Hotel while waiting for plant tour bus. (3) Completely filled Grand Ballroom at the Annual Banquet. (4) A few of the many groups at the Monday evening MFSA Ball. (5 & 6) Scenes at the MFSA Cocktail Party preceding the Annual Banquet.

BOSTON BRANCH HOSTS BANNER AES 48th ANNUAL CONVENTION

CLIMAXING its 52nd year, American Electroplaters' Society, Inc. (AES) conducted its 48th Annual Convention at the Statler-Hilton Hotel, Boston, Massachusetts, June 18-23, 1961, with a large attendance of AES members, their families and their guests present, including scientists prominent in electroplating, metal finishing and allied arts that came from near and far, here and abroad.

Observing its own 40th Anniversary as a chartered Branch of the Society, AES's Boston Branch, for the fourth time in two-score years, hosted the Annual Convention. It was generally well-considered.

"AES WEEK IN BOSTON" BY MAYORALTY EDICT

The AES was respectively welcomed to the Commonwealth of Massachusetts and to the historic City of Boston by Governor John A. Volpe and by Mayor John F. Collins. The entire week of the AES's Convention was, in fact, proclaimed by Mayor Collins as "American Electroplaters' Society Week in Boston."

Product of four years of planning and effort by a large and well-departmentized Host Branch Convention Committee headed by Convention General Chairman Louis V. Gagnon who was substantially aided by Co-Chairmen Manson Glover (Finance), Dr. George P. Swift (Administration), and John Wright (Hospitality), the AES's 1961 Boston National Convention paraded a creditable array of Convention educational, fellowship and relaxational fare. A New England atmosphere and spirit prevailed, and among features were well-received Ladies' Programs and Children's Programs—abundant plant tours many gifts and prizes.

BATTELLE'S FAUST DELIVERS "BLUM LECTURE"

Educational sessions numbered nine. Experts presented twenty-six technical and scientific papers heightening knowledge in electroplating, metal finishing and allied arts. High spots of the nine sessions were not only the third annual "William Blum Lecture" that was delivered as the Educational Program's lead-off attraction by Dr. Charles L. Faust (Battelle Memorial Institute), 1960 winner of the "AES Scientific Achievement Award," the Society's highest scientific honor, but also the Convention's two-session, eight-paper "Finishing of Light Metals Symposium." In addition, a "Research Program Session" not only heard the important results stemming from AES's Projects No. 14 and No. 15 but also a general progress report on the 1960-1961 AES Research Program by the Chairman of the Society's responsible Research Committee.

Under the active planning and supervision of the AES's Editorial Board itself, the Convention's Educational Sessions were programmed for the AES by able Host Branch Educational Sessions Chairman George J. Marotta (Western Electric Company) and his Co-Chairman Charles Levy (Gillette Safety Razor Company), with Dr. Gerald H. Kissin (Kaiser Aluminum and Chemical Corporation) a special member of that Boston Educational Committee, responsible for the "Finishing of Light Metals Symposium."

BRENNER WINS AES's HIGHEST SCIENTIFIC AWARD

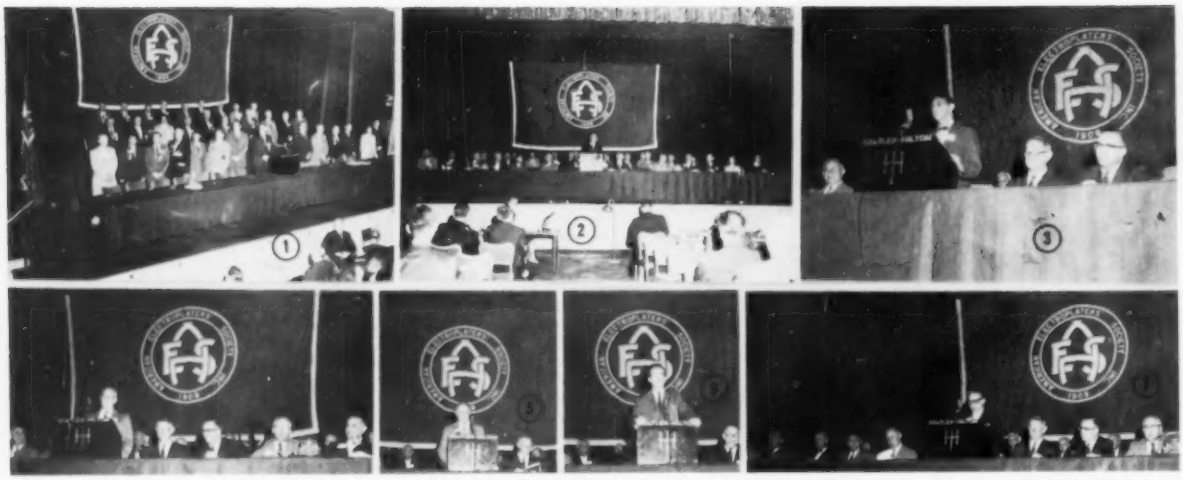
Dr. Abner Brenner of the National Bureau of Standards was announced at the Grand Opening Session of the Convention on Monday, June 19, as the 1961 winner of the "AES Scientific Achievement Award." And at the First Business Session of the Supreme Society that same forenoon, winning authors of outstanding papers published in AES's PLATING MAGAZINE and in its TECHNICAL PROCEEDINGS during the 1960-1961 AES competition year were presented with their earned awards.

READ RECEIVES COVETED AES FOUNDER'S AWARD

At the Farewell Banquet, Thursday, June 22, Dr. Harold J. Read of Pennsylvania State University was announced as the second winner of AES's annual "Charles Henry Proctor Memorial Leadership Award" donated by Mr. and Mrs. William Osborne Preston, son-in-law and daughter respectively of the late Charles Henry Proctor, AES's founding father. From the hands of the National President, Dr. Read consequently received a substantial cash award plus the handsome Proctor Award scroll. He earned that Award by virtue of his service both in creating the "Hydrogen Embrittlement in Metal Finishing Symposium" that featured the Society's 47th Annual Convention, Los Angeles, California, July 24-28, 1960, and in serving as AES Editor of the book embodying the technical papers presented at that Symposium, plus a number of marshaled others, that is being published for the Society, by contractual agreement, by the Rheinhold Publishing Corporation of New York, New York.

BORLET ELECTED 1961-1962 AES PRESIDENT

AES First Vice President Chester G. Borlet, Grand Rapids Brass Company, Grand Rapids, Michigan, was elected 1961-1962 National President of the Society at the Second Business Session of the Supreme Society, Thursday, June 22, and was installed as AES's 47th National



(1) National Officers, Past Presidents, Honorary Members, Convention Chairmen, Presidents of MFSA and NAMF, other honored guests on the dais at the Convention opening session stand for the National Anthem. (2) Simon D. Strauss delivering the Keynote address. (3) Dr. Abner Brenner responds to announcement that he is the 1961 winner of the AES Scientific Achievement Award. (4) William M. Tucker announced the choice of Dr. Brenner. (5) National President W. Andrew Wesley at podium. (6) Massachusetts Lieutenant Governor McLaughlin greeting the AES in Convention. (7) National Executive Secretary John P. Nichols reads the Memorial Roll.

President midst honors. He succeeded Dr. W. Andrew Wesley, International Nickel Company, Bayonne, New Jersey, who will serve on the 1961-1962 Executive Board as Immediate Past President.

To the Third Vice Presidency, the AES's governing council elected Edward E. Oberland, Western Electric Company, Baltimore, Maryland. And to AES's First and Second Vice Presidencies, the governing council respectively upgraded Manuel Ben, General Motors Corporation, Detroit, Michigan, and Frank O. Beuckman, Eastman-Kodak Company, Rochester, New York.

AES's NEXT CONVENTION:

MILWAUKEE, JUNE 24-28, 1962

Aside from the already named arrangement leaders of the AES's 48th Annual Convention, Convention General Chairman Gagnon's functional Sub-Chairmen included Mrs. George P. Swift (Ladies' Program), Mrs. George J. Marotta (Children's Program), Hubert H. Foley (Banquet), James H. Anderson (Registration), George E. Landis (Transportation), Paul F. Reddy (Hotel), Edmund S. Jevely (Plant Visits), Joseph T. Sullivan (Outing) and John A. Swift (Publicity).

The 49th Annual Convention of the Society will be held at the Schroeder Hotel, Milwaukee, Wisconsin, June 24-28, 1962, with the AES's Midwest Regional Council as Host Region. The Region is composed of the AES's chartered Chicago, Milwaukee, Mississippi Valley, Rockford, St. Joseph Valley and St. Louis Branches. It will be the first time in AES history that an AES National Convention will be hosted by an AES Region instead of by an AES single chartered Branch. Dynamic Herman A. Tessmann of the Milwaukee Branch is Convention General Chairman.

Below, meantime, is the day-to-day Log of AES's 48th Annual Convention.

SUNDAY, JUNE 18

CONVENTION registration was launched with a substantial traffic of registrants. Meanwhile, the Executive Board met in full day's meeting and overcame a substantial Agenda. That same afternoon, the Credentials Committee, under Chairman Robert L. Garrett Jr., met with the Executive Board and completed its final report. The AES Honorary Membership Award Committee also met in executive session.

The ladies of the Boston Branch welcomed the ladies of AES generally at a delightful tea of greeting. Mrs. George Parsons Swift, Chairman of the Ladies' Program, headed the welcoming group of Boston ladies.

And that evening, in the Statler-Hilton's handsome Grand Ballroom, a large AES audience attended and enjoyed the 48th Annual Convention's "Get-Together Party."

MONDAY, JUNE 19

THE Grand Ballroom was site of the Grand Opening Session that memorably opened the 48th Annual Convention of the Society. A three-tier stage dais fronted that Assembly Hall, and dais backdrop was the AES's ceremonial banner.

The big room was filled by 10 o-clock and dais occupants were at their places as the stage curtains were drawn to commence the program. Among them were all six of AES's National Officers, the President of the Boston Branch and the heads of the Convention. Also among them were some fifteen AES Past National Presidents and eight of the AES's fourteen living Honorary Members. And among them was Lieutenant Governor Edward F. McLaughlin Jr., representing Governor John A. Volpe, plus Mayor John F. Collins of Boston who had already declared AES's Convention Week as "American Electroplaters' Society Week in Boston."

OPENING SESSION KEYNOTES CONVENTION

Following the rendering of the National Anthems and delivery of the Invocation by the Reverend Leonard A. Chesworth, plater-minister of the Boston Branch, the AES was formally welcomed to Boston by Mayor Collins. Presented next by Convention General Chairman Louis V. Gagnon who served as Master of Cermonies, National President W. Andrew Wesley responded to the Community's greeting in behalf of the Society.

The assembly next heard the 1960-1961 Memorial Roll read by National Executive Secretary John P. Nichols, then stood in a reverent moment of silence as a tribute to the memory of the AES's dead during the Society's 1960-1961 fiscal year.

Lieutenant Governor McLaughlin next extended the Commonwealth of Massachusetts' greetings to the Society, and the assembly also heard brief welcoming talks by Boston Branch President Hubert H. Foley and by Ladies' Chairman Marjorie Swift. The keynote address was delivered by Simon D. Strauss, Vice President of the American Smelting and Refining Company and Immediate Past President of the American Zinc Institute.

BRENNER GARNERS AES SCIENTIFIC AWARD

The Washington scientist, Dr. Abner Brenner of the National Bureau of Standards, was next announced as 1961 winner of the annual "AES Scientific Achievement Award," the Society's highest scientific honor. The an-

(1) The first Business Session of the Supreme Society. (2) Glenn H. Friedt Jr., right, presents Carl E. Heussner AES Gold Medal Award to Dr. R. J. Barton. (3) National President Wesley, who presented all of the other paper awards, congratulates, l. to r., S. P. Gary, Paul Glab and R. Scott Modjeska, winners of the AES Bronze Medal Award. (4) William H. Safranek, co-author winner of the Chromium Plating Award and the Zinc Award. (5) C. L. Alderuccio, co-author winner of the Robert S. Leather Mechanical Finishing Award. (6) Robert A. Ehrhardt, winner of the Precious Metal Plating Award. (7) Charles C. Cohn, co-author winner of the Aluminum Finishing Award. (8) Ignatius Tsu, winner of the George B. Hogaboom Memorial Nickel Plating Award.

nouncement was made by Chairman William M. Tucker of that Award's Selection Committee.

The Grand Opening Session terminated with the traditional ceremony during which Convention General Chairman Gagnon delivered the Society's golden gavel to National President Wesley thereby symbolically turning the Convention over to the Society's National President.

GOVERNORS HOLD FIRST BUSINESS SESSION

The First Business Session of the Supreme Society, AES's summit governing council, was held immediately after the Grand Opening Session in the same Assembly Hall, with National President Wesley himself presiding. And as first order of business, that Supreme Society Meeting approved the report of the Credentials Committee presented by Committee Chairman Robert L. Garrett Jr.

PAPER AWARDS WINNERS RECEIVE REWARDS

Besides receiving the reports of the six National Officers and of the Society's standing and special Committees—besides hearing of the permanent chartering of the San Diego Branch as the AES's 60th Branch, and of the temporary chartering of the Central Iowa Branch—besides preliminarily considering the 1960-1961 Financial Statement and the proposed 1961-1962 AES/PLATING MAGAZINE General Operating Budget—besides hearing proposed Constitutional and Bylaw amendments—the Society's governing council also heard the report of the 1960-1961 Paper Awards Committee headed by Chairman Frank Tirendi. Consequently, the following awards were then made to the following, with Glenn H. Friedt Jr., himself presenting the Heussner Gold Medal, the Society's highest technical paper award:

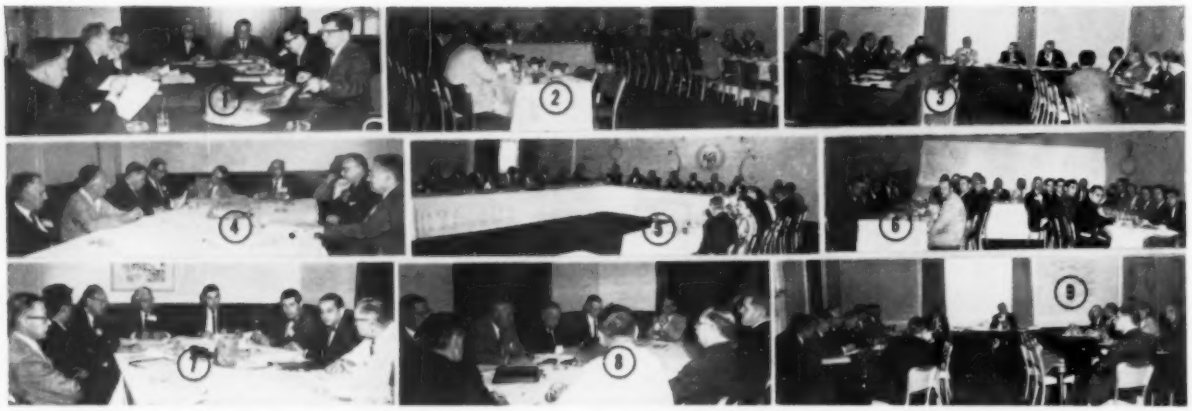
THE CARL E. HEUSSNER AES GOLD MEDAL AWARD

Co-sponsored by the United Platers' Foundation (Glenn H. Friedt, Trustee) and AES, for the best paper published in AES publications during the fiscal year. Awarded to "On the Mechanism of Transport of Hydrogen Across a Solution-Metal Interface" by R. J. Barton, Advanced Metallurgical Studies Branch, Wright Air Development Division, Wright-Patterson Air Force Base, Ohio. (TECHNICAL PROCEEDINGS, 1960 Edition.)

THE AES SILVER MEDAL AWARD

Sponsored by AES, for the second best paper published during the fiscal year. Awarded to "Cleaning in the Electronics Industry" by D. E. Koontz, D. O. Feder and C. O. Thomas, Bell Telephone Laboratories, Inc., Murray Hill, New Jersey. (TECHNICAL PROCEEDINGS, 1960 Edition.)

(1) Attentive listeners to the 1961 William Blum Lecture. (2) Dr. Charles L. Faust delivering the William Blum Lecture. At the dais, l. to r., Charles Levy, George J. Marotta, Dr. Faust, Dr. A. Kenneth Graham, National President W. Andrew Wesley, Editorial Board Chairman John P. Nichols, Dr. Gerald H. Kissin. (3) Dr. Faust presented AES Scientific Achievement Award by Dr. Wesley.



COMMITTEE MEETINGS, BREAKFASTS AND LUNCHEONS. (1) The Membership Committee in session. (2) The Research Program breakfast. (3) Research Committee meeting. (4) Publications Committee meeting. (5) Branch Secretaries' Luncheon. (6) Educational Committee and Branch Educational Chairmen's Luncheon. (7) Educational Committee meeting. (8) Public Relations Committee meeting. (9) Editorial Board meeting.

THE AES BRONZE MEDAL AWARD

Sponsored by AES, for the third best paper published during the fiscal year. Awarded to "Solution Transfer in Barrel Plating" by Paul Glab, Northwestern Plating Works, Chicago, Illinois and R. Scott Modjeska and S. P. Gary, Scientific Control Laboratories, Inc., Chicago, Illinois. (TECHNICAL PROCEEDINGS, 1960 Edition.)

THE GEORGE B. HOGABOOM MEMORIAL NICKEL PLATING AWARD

Co-sponsored by AES and its Hartford Branch. Awarded to "The Preparation and Properties of Iron-Nickel Films" by Ignatius Tsu, International Business Machines Corporation, San Jose, California. (PLATING MAGAZINE, June 1960.)

THE CHROMIUM PLATING AWARD

Sponsored by the Nutmeg Chrome Corporation. Awarded to "Use of Selenic Acid for Plating Microcracked, Protective and Decorative Chromium Plate" by W. H. Safranek and R. W. Hardy, Battelle Memorial Institute, Columbus, Ohio. (PLATING MAGAZINE-September 1960.)

THE ROBERT S. LEATHER MECHANICAL FINISHING AWARD

Sponsored by the Lea Manufacturing Company. Awarded to "Adherence of Thick Chromium Deposits as Affected by Surface Preparation" by J. G. Poor, Spar-Tan Engineering Co., Los Angeles, California and H. Chessin and C. L. Alderuccio, Van der Horst Corporation of America, Olean, New York. Present connection of Messrs. Alderuccio and Poor, Allied Chemical Corporation. (PLATING MAGAZINE, July 1960.)

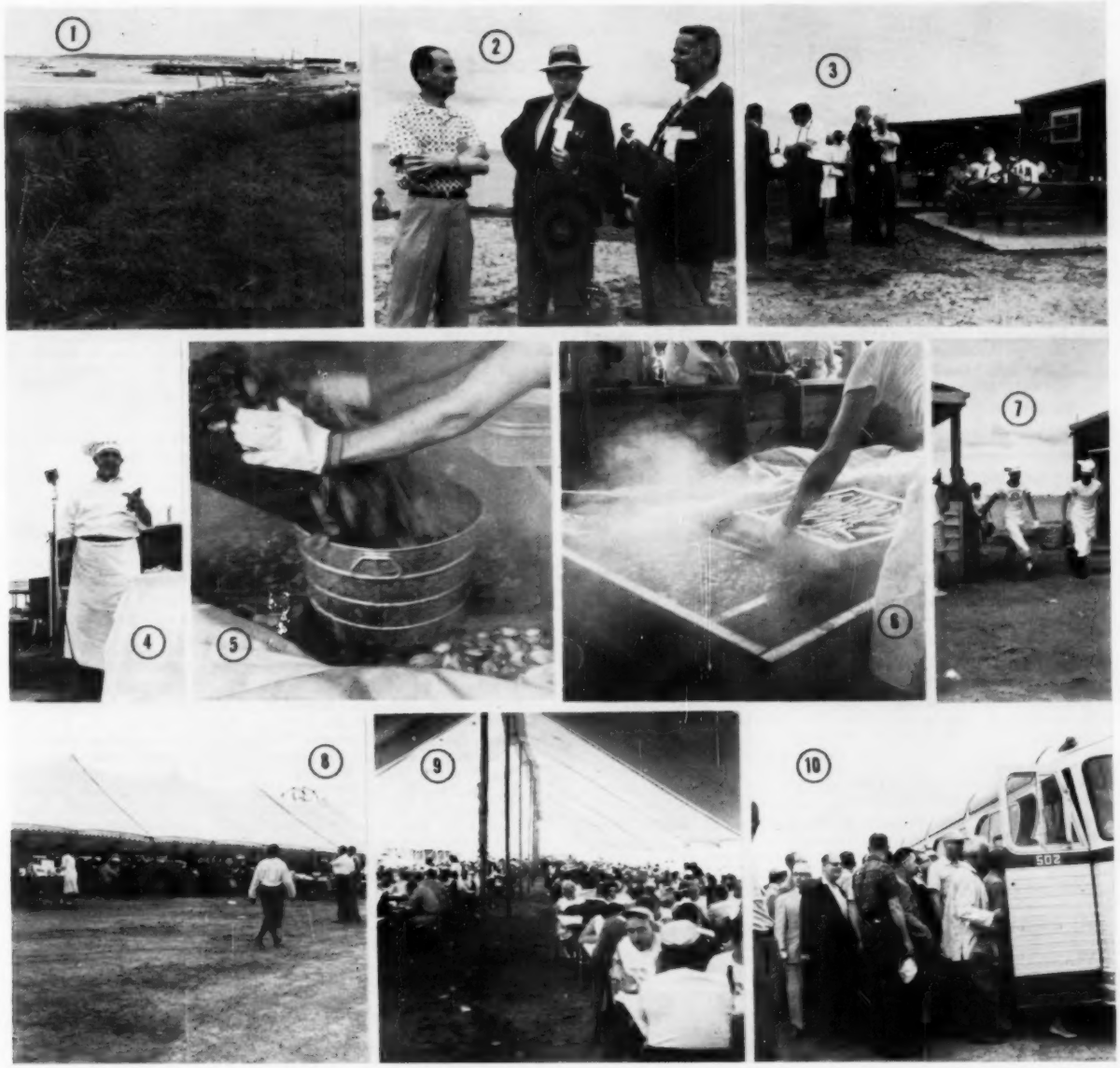
THE PRECIOUS METAL PLATING AWARD

Sponsored by the International Nickel Company, Inc. Awarded to "Acid Gold Plating" by R. A. Ehrhardt, Bell Telephone Laboratories, Inc., Murray Hill, New Jersey. (TECHNICAL PROCEEDINGS, 1960 Edition.)

THE ALUMINUM FINISHING AWARD OF AES

Sponsored by the Kaiser Aluminum & Chemical Company. Awarded to "Superior Sealing of Anodized Aluminum and its Alloys" by Charles C. Cohn, Colonial Alloys Company, Philadelphia, Pennsylvania

(Left) Mary Lou Wesley, piano soloist with the Boston Pops Orchestra at the AES "Fun with Fiedler" evening at Symphony Hall, congratulated by the concert master as she receives standing ovation by the audience. Conductor Arthur Fiedler stands immediately behind the piano. (Right) Pianist Mary Lou Wesley autographs program for an admirer. Her father and mother, AES National President and Mrs. Wesley are one row in back, to left and to right. At far right, National Past President Francis T. Eddy.



NEW ENGLAND CLAMBAKE. (1) View toward Plymouth Harbor. (2) Convention Chairmen take a breather. L. to r., Hubert H. Foley, Boston Branch President and Banquet Chairman; Manson Glover, Co-Chairman for Finance; Louis V. Gagnon, General Chairman. (3) Gaining an appetite prior to the clam bake. (4) Call to the clam bake. (5) Clams! Bushels of them. (6) The food is ready. (7) Hurry call for more clams. (8 & 9) The clam bake in full sway under the big tent. (10) Time to return to Boston.

and Harry Sosson, formerly Research and Development Division, Chemical Laboratory, Department of the Navy, Philadelphia, Pennsylvania. (PLATING MAGAZINE, August 1960.)

THE ZINC AWARD OF AES

Sponsored by the American Zinc Institute. Awarded to "Data on the Corrosion Resistance of Electroplated Zinc Die Castings" by W. H. Safranek, H. R. Miller, R. W. Hardy and C. L. Faust, Battelle Memorial Institute, Columbus, Ohio. (PLATING MAGAZINE, April 1960.)

The Paper Awards Committee made no 1960-1961 selections for the "John J. Hanney Memorial Copper Plating Award" or the "Organic Finishing Award" of AES due to less than the required number of papers available for selection in these particular categories. Available papers were referred by that Committee to its successor for 1961-1962 award consideration.

1961-1962 COMMITTEE APPOINTMENTS ANNOUNCED

In behalf of the Executive Board, National Executive Secretary Nichols next announced appointment by that Board of the following to these AES Standing Committees for respective three-year terms effective June 19, 1961 (unless otherwise specified):

EDITORIAL BOARD:

Myron B. Diggin, Dr. Frederick A. Lowenheim and George J. Marotta. Also Joseph Andrus (1 year).

EDUCATIONAL COMMITTEE:

I. Laird Newell and Rene Sonnenfeldt (One more to be appointed).

HONORARY MEMBERSHIP AWARD COMMITTEE:

Ralph D. Wysong and Milton Nadel (2-year terms).

(1) One of the nine Educational Sessions. (2) Participants in Finishing of Light Metals Symposium at breakfast. (3) Discussion period at Educational Session. (4) Speakers' breakfast. (5) Educational Chairman Marotta, at podium, opens an Educational Session. (6) Symposium speakers and chairmen. Seated, Dr. Girard H. Kissin, Charles Levy, George J. Marotta, Hubert H. Foley, Robert Anderson. Standing, Dr. J. F. Murphy, H. K. DeLong, J. S. Kirkpatrick, Dr. Roy C. Spooner, H. J. Wittrock, Leo Missel, D. J. Levy, W. C. Cochran.

MEMBERSHIP COMMITTEE:

William G. Giesker, Richard C. Watson and Irvin M. Weiss. Also Bruce Leslie (Australian Consultant) and Gordon A. Lince (Canadian Consultant).

PUBLICATIONS COMMITTEE:

Dr. Russell E. Harr and William H. Safranek (One more to be appointed).

PUBLIC RELATIONS COMMITTEE:

Donald L. Allie, James H. Lindsey and Vernon Schaeffer. Also Guy A. Cummings Jr. (To fill one year unexpired term).

RESEARCH COMMITTEE:

William P. Innes, Harold A. Kahler and R. Scott Modjeska.

SCIENTIFIC ACHIEVEMENT AWARD COMMITTEE:

Dr. Charles L. Faust and Dr. A. Kenneth Graham.

While the youth of AES toured the Salem-Marblehead area, three luncheons occupied adults this Monday noon period, namely (1) the Ladies' repast and entertainment in the Statler-Hilton Ballroom area; (2) the Speakers' Luncheon, and (3) the large traditional Branch Secretaries' Luncheon held in Parlor A, with National Executive Secretary Nichols presiding.

OPENING EDUCATIONAL SESSION HEARS FAUST

The widely anticipated Opening Educational Session took place at 2 P.M. in the Grand Ballroom before a large audience. Host Branch Educational Sessions Chairman George J. Marotta introduced Dr. A. Kenneth Graham, pinch-hitting for Dr. William Blum, who then presided for the balance of that impressive Session.

The third annual "William Blum Lecture" was there delivered by Dr. Charles L. Faust, 1960 winner of the "AES Scientific Achievement Award," on the subject "The Challenge Before Us." At its conclusion, he was presented with the laminated scroll of the "AES Scientific Achievement Award" plus a $500 attendant honorarium by National President Wesley in behalf of American Electroplaters' Society, Inc.

EDUCATION AND MEETINGS FEATURE AFTERNOON

While large audiences attended that afternoon's dual Educational Sessions (A and B) that followed the Opening Educational Session, and while others toured the plants of the Keystone Camera Company and of the Boston Globe, the Editorial Board was meantime in session in Parlor C with Board Chairman John P. Nichols presiding.

The Editorial Board complimented its retiring members, namely James H. Lindsay, Robert A. Earhardt and William H. Safranek for creditable performance during their respective three-year terms, then welcomed its new members. It extended Board commendation to Host Branch Educational Chairman George J. Marotta, to his Co-Chairman Charles Levy and to Dr. Gerald H. Kissin for high-grade results in the development for it, of the Boston Convention's Educational Program. It next finalized work remaining on that particular Boston Convention program, then commenced its arduous work on the 1962 Milwaukee Convention's Educational Sessions, with Joseph M. Andrus, the Host Branch Educational Sessions Chairman, present and prominent in the discussion and planning.

PAST PRESIDENTS AWARD TO T. R. BOGGESS

In Room 437, meanwhile, the Publications Committee of the Society was itself in executive session, with Chairman Samuel Helman presiding. Later that afternoon, the Order of Past Presidents, under Chairman Samuel S. Johnston, conducted its Annual Business Meeting. The Order thereafter held its Annual Dinner Meeting. At that

(1) Southwestern Regional Council Meeting. Chairman Browning, third from left. (2) Midwest Regional Council Chairman Diveley, at head of table, conducts meeting of representatives of Chicago, Milwaukee, Mississippi Valley, Rockford, St. Joseph Valley and St. Louis Branches. (3) Representatives of Regional Councils and Groups meet informally. National Executive Secretary Nichols presided.

(Left) Order of Past Presidents Meeting. Clockwise from nearest camera at left, Kenneth M. Huston, Clyde Kelly, Ellsworth T. Candee, George J. Wagner, Samuel S. Johnston, Herberth E. Head, Ralph D. Wysong, Dr. W. Andrew Wesley, Dr. George P. Swift, Frederick Fulforth. (Right) Past Presidents, their wives and guests attend annual dinner of the Order.

Boston meeting of the Order, in fact, Past President Francis T. Eddy was elected 1961-1962 Chairman, and Past President Ralph D. Wysong was named its Secretary-Treasurer. It voted its 1960-1961 "Order of Past Presidents Award" to Talmage R. Boggess of Vinton, Virginia and AES's Blue Ridge Branch.

GALA MFSA BALL ENDS EVENTFUL DAY

That eventful Monday concluded with a gala Convention Ball given by the Metal Finishing Suppliers' Association (MFSA) that earlier that day had elected as its 1961-1962 President, Jeffrey G. Carrique of the Alloy Craft Company of Montreal, Canada. It became known during the Convention, furthermore, that the National Association of Metal Finishers had elected Edward N. Marlette of the Marlette Plating Company, Inc., Buffalo, New York, as its President for 1961-1962.

TUESDAY, JUNE 20

THIS eventful day made its debut with the "Charles Henry Proctor Memorial Leadership Award" Breakfast and the usual daily Speakers' Breakfast. These were followed by respective meetings of the (1) AES Membership Committee, (2) AES Public Relations Committee, and (3) AES Educational Committee. A feature of the Public Relations Committee meeting was the Committee's recognition of noteworthy public relations deeds performed during fiscal 1960-1961 by the AES's Waterbury, Milwaukee and Toronto Branches in particular, and the Committee intends hereafter to select and honor even more materially the outstanding deeds in public relations of AES's respective chartered Branches. Committee Chairman Arthur G. Pierdon presided.

FINISHING OF LIGHT METALS SYMPOSIUM STARS

While the youth of AES toured Boston and Cambridge—and while the ladies toured the North Shore enroute to Ipswich—and while many AES members participated in a plant visit of the Gillette Safety Razor Company—the host of AES's membership attended the morning session of the widely awaited "Finishing of Light Metals" Symposium that occurred that forenoon in the Grand Ballroom with a capacity attendance present.

The large audience was reminded by Dr. Gerald H. Kissin, Sessions Chairman, that each of the four presented papers on the finishing of Aluminum, together with the discussion attending the delivery of each such paper, would not only be published in the AES's book TECHNICAL PROCEEDINGS (1961 Edition) but would also be included in a special book, accompanied by other papers on the subject being procured by him for AES, to be thereafter published by the Reinhold Publishing Company for world sale, for educational purpose, by contract with AES.

FORUM ON LIGHT METALS END DAY'S SESSIONS

A feature of this noteworthy day was the joint luncheon of the AES Educational Committee and a large number of Branch Librarians present. National First Vice President Chester G. Borlet presided. Numerous subjects were discussed pointing toward implementing the Society's expanding educational program

Meantime, the ladies enjoyed a delightful luncheon at the famed Castle Hall on the Crane Estate in nearby Ipswich. A second large group of AES members visited the plant of the Gillette Safety Razor Company. The afternoon session of the "Finishing of Light Metals" Symposium, however, engaged most knowledge-bent members of the Society, with Host Branch Educational Committee Co-Chairman Charles Levy presiding. This afternoon's session heard two papers on finishing of Magnesium and two other papers on the finishing of Beryllium. The Symposium concluded later that afternoon with a well-attended "Finishing of Light Metals" forum in the Grand Ballroom.

REGIONAL COUNCILS HOLD REGIONAL MEETINGS

Meantime, the AES's Midwest Regional Council conducted its scheduled meeting, with Chairman Leslie L. Diveley presiding and with accredited representatives present from AES's Chicago, Milwaukee, Mississippi Valley, Rockford, St. Joseph Valley and St. Louis Branches. Among subjects discussed were not only the Region's Annual Meeting to occur in Chicago this autumn with a Symposium on the "Finishing on Uncommon Bases" as educational feature, but also policy matters bearing upon the AES's 49th Annual Convention to be held in Milwaukee, Wisconsin, June 24-28, 1962 hosted by that AES Region for the Society.

Elsewhere that same afternoon, the new but spurting Southwestern Regional Council conducted its first Annual Meeting. Representatives were present from most of its constituent Branches, namely Dallas-Fort Worth, Houston, Denver, Kansas City, Wichita and Phoenix. Chairman Myron A. Browning presided.

Later that afternoon, the leadership of most of AES's eight current Regional Councils and Regional Groups met together for informal exchange of views and ideas of mutual interest, with National Executive Secretary Nichols presiding. Regions and groups represented included the Empire State Regional Group, Metropolitan Regional Group, Midwest Regional Council, New England Regional Group and the Tri-State Regional Council.

FUN WITH FIEDLER TERMINATES BUSY TUESDAY

Relaxation followed that demanding day's business. AES members and their families converged "en masse" upon Boston's Symphony Hall and enjoyed the community's renowned Boston Pops for "Fun with Fiedler." As an interesting sidelight, Miss Mary Lou Wesley, accomplished pianist daughter of AES's encumbent National President, was specially featured by Fiedler that evening as soloist, and scored a triumph.

WEDNESDAY, JUNE 21

MEMBERS of the Research Committee, District Supervisors, Past Research Committee Chairmen, Regional Research Finance Chairmen and other key AES Research Program personnel, together with AES's six National Officers, attended the traditional Research Program Breakfast held in the Statler-Hilton's Parlor A early this forenoon. Elsewhere, the day's speakers were guests of the Convention at breakfast.

After the breakfast, a host of AES members either attended Educational Session E in the Grand Ballroom,

(1) Talmage R. Boggess receives Order of Past Presidents Annual Award from Past President Samuel S. Johnston. (2) T. R. Boggess presented with Award of Merit by President Wesley. (3 & 4) Newly elected Honorary Members and the National President. Left to right, picture 3, Myron B. Diggin, William L. Neill, Manson Glover and Dr. Wesley. Picture 4, Raymond J. O'Connor and Dr. Wesley. Daniel Gray also was elected to Honorary Membership, but was not present. (5) George J. Marotta of Boston Branch, left, accepts from Vice President Manuel Ben the Membership Expansion Competition prize for Division A, which was won by his Branch. (6) Dallas-Fort Worth Branch won Division B of the membership competition. Prize was accepted for Branch by Myron A. Browning. (7) Talmage R. Boggess accepted for Blue Ridge Branch the prize for topping Division C Branches in the membership competition.

with Dr. George P. Swift presiding, or Educational Session F in the nearby Georgian Room, with Hubert H. Foley in the chair.

RESEARCH COMMITTEE FINALIZES 1961-1962 PROGRAM

The Research Committee Annual Meeting immediately followed its traditional Annual Breakfast. After transacting much policy and procedural business, the Research Committee proceeded to ratify a 1961-1962 Research Pro-Program embodying seven active research projects during the fiscal year, including Project No. 12 (Columbia University); Project No. 14 (Ontario Research Foundation); Project No. 15 (Detroit Area); Project No. 16 (University of Pennsylvania); Project No. 18 (Chicago Area); Project No. 19 (National Bureau of Standards) and Project No. 20 (Dallas-Fort Worth Aerospace Project). It adopted a minor Bylaw amendment. It approved its 1961-1962 Research Program Operational Budget, later ratified by the Executive Board. It then elected Dr. Harold J. Wiesner of the Bendix Products Aviation Corporation as 1961-1962 Research Committee Chairman.

Apart from conducting other business important to the AES Research Program, the Committee also elected Dr. Burton B. Knapp, International Nickel Company, as Vice Chairman for Research, and Edward J. Kubis of the Wyandotte Chemicals Corporation as Vice Chairman for Finance for 1961-1962. It warmly commended its retiring members, namely Raymond L. Mitchell, Walter E. Moline and D. G. Foulke for creditable three-year service to AES Research.

BOSTON BRANCH PROVIDES PLYMOUTH CLAMBAKE

All AES roads led to historic Plymouth, Massachusetts that afternoon for another of those Boston Branch Clambakes that made three prior AES Boston National Conventions famous and well-remembered. Despite inclement weather, the 1961 edition was generally well-received.

THURSDAY, JUNE 22

AS SPEAKERS of the day breakfasted in the Hancock Room of Boston's Statler-Hilton, the youth of AES departed for their day-long tour of the Museum of Science and Planetarium, followed by a boat ride on the Charles River.

Non-delegates either attended one or the other of this forenoon's Educational Sessions (G and H) or joined the large group that visited (1) the Western Electric Company at North Andover, Massachusetts, (2) lunched at Western Electric's plant, then (3) visited the Raytheon Manufacturing Company at Andover, Massachusetts.

The ladies of the Society meanwhile toured historic Boston in the morning, then lunched in the Dorothy Quincy Suite of Boston's John Hancock Building.

While the ladies thus spent this afternoon, many non-delegates were educationally enriched at the closing Educational Session (I).

GOVERNING COUNCIL ENACTS SIGNIFICANT MEASURES

For the governors of AES, however, this was a long and very busy legislative day. With a large number of accredited Delegates and Alternate Delegates present, the Supreme Society's Annual Meeting commenced at 9 A.M. in Parlors A, B, C, and continued through the day, with National President Wesley in the chair.

The Society's governing council's legislative actions and enactments of that Annual Meeting included the following:

1. Following detailed consideration, the Financial Statement of the Society and its PLATING MAGAZINE for the eleven-month fiscal period spanning July 1, 1960 through May 31, 1961 (latest possible at this eleven-month stage) was duly approved.

2. By poll vote of Branches, the governing council overwhelmingly approved the 1961-1962 General Operating Budget of the Society and its PLATING MAGAZINE covering the fiscal year from July 1, 1961 through June 30, 1962 as submitted by the Executive Board. It embodies a budget of AES/PLATING operating expenses aggregating $230,555 for the fiscal year from July 1, 1961 through June 30, 1962 compared with the 1960-1961 Operating Expense Budget totaling $257,125 for the twelve-month period July 1, 1960 through June 30, 1961 that had been approved by the Supreme Society at its Los Angeles Annual Meeting July 28, 1960. So as to balance esti-

(1) Past President Ralph D. Wysong pins National Officers button on newly elected National Third Vice President Edward E. Oberland. Manuel Ben, at left; Chester G. Borlet, extreme right. (2) Chester G. Borlet, 1961–62 National President, presides at Supreme Society meeting for first time. (3) Past President Ralph D. Wysong, seated, received plaudits of the Delegates and Alternate Delegates as he takes his place in the audience upon completing five years service on the Executive Board. (4) Tally on black board shows Dallas the choice as the 1967 Convention city. (5) Retiring President Wesley relinquishes gavel to President Borlet. (6) President Borlet, right, presents plaque to 1960–1961 President Wesley. (7) Ralph D. Wysong, at microphone, installs 1961–1962 AES National Officers. L. to r., First Vice President Manuel Ben, Third Vice President Edward E. Oberland, President Chester G. Borlet, Second Vice President Frank O. Beuckman, Immediate Past President W. Andrew Wesley. (8) Dr. Wesley at podium conducting Supreme Society meeting. (9) The Supreme Society in annual meeting.

mated 1961-1962 AES operating income and budgeted AES operating expense, it necessarily authorized an operational subsidy from AES's General Fund of $25,455 for that 1961-1962 fiscal year.

3. By a Supreme Society resolution widely supported and enacted, the Executive Board was instructed to appoint an AES Constitution and Bylaw Revision Committee, and to charge it with the mission of constructing a new or revised AES governmental instrument, modern and effective, for tentative consideration by the Supreme Society at its Interim Meeting, Indianapolis, January 13, 1962 and for final consideration and enactment at its Annual Meeting in Milwaukee, June 28, 1962.

4. To that authorized AES Constitution and Bylaw Revision Committee, the Supreme Society referred the Executive Board's proposed Per Capita Tax and Membership Dues increase proposed to become effective in fiscal 1962-1963 so as to balance AES operating income and budgeted AES operating expense without need for further foreseeable operating subsidy from the AES General Fund.

5. By enacted resolution, moreover, the Supreme Society instructed the Executive Board to invoke the initiative and referendum provisions of the AES Constitution and Bylaws and, by letter ballot, seek amendment of the Constitution so as to delete the mandatory requirement that a copy of the Society's annual book, TECHNICAL PROCEEDINGS, be issued each year to the Society's members in good standing as an entitlement of AES membership. This action in no way affects the 1961 edition of TECHNICAL PROCEEDINGS.

6. The Supreme Society also amended the Constitution and Bylaws of AES so as to require Per Capita Tax payment for their new members by Branches starting with and covering the full fiscal quarter during which such new members are elected.

7. The governing council also amended the Bylaws of the Society and altered the Branch title "Librarian" to "Branch Educational Chairman." Another enacted amendment broadened the function of the Publications Committee.

8. The Boston Branch was declared winner of the Society's 1960-1961 Branch Membership Expansion Competition in Division A and that Branch consequently won the $50 annual prize from AES for that achievement. The Dallas-Fort Worth Branch was declared the winner in Division B and the Blue Ridge Branch prevailed in Division C. Each of these divisional winners was also rewarded with a $50 check from AES for its 1960-1961 membership expansion accomplishments.

9. Upgraded by election to the select circle of AES National Honorary Membership, the Society's highest membership class, earned only by outstanding AES service over a long span, were five AES stalwarts, namely Past President William J. Neill of Columbus, Myron B. Diggin of Newark, Manson Glover of Boston, Raymond J. O'Connor of New Haven and Daniel Gray of Syracuse, N. Y. That select circle was consequently increased by this action to a current nineteen such living Honorary Members.

10. The Executive Board next bestowed Awards of Merit upon Rafael Diaz of the Pittsburgh Branch and Talmage R. Boggess of the Blue Ridge Branch. Handsome laminated plaques were presented to each

Dr. Harold J. Read, left, wins "Charles Henry Proctor Memorial Award." Shown at the Farewell Banquet with Dr. Wesley, Chairman of the Selection Committee. Dr. Read was honored for his development of the Hydrogen Embrittlement Symposium for the Los Angeles Convention and the editing of the soon to be published AES book on that subject.

of these honored AES members by National President Wesley in the Board's behalf.

11. It witnessed the bestowal by the National President in behalf of the Order of Past Presidents of that Order's Annual Award for outstanding performance for AES. That high Award also went to Talmage R. Boggess of the Blue Ridge Branch.
12. It heard and commended the report of the Boston Convention Committee, and also heard reports as to AES's future Conventions from Chairman Herman A. Tessmann (Milwaukee—1962); Flavio J. La Manna (Atlantic City—1963) and Convention Chairman Anthony P. Julius (St. Louis—1964).
13. It also heard the report as to the Society's coming Ninth Interim Meeting (Indianapolis, Indiana, January 13, 1962) by John Hood for Arrangements Chairman Quentin O. Shockley of the Indianapolis Branch.
14. From among documented Branch invitations for selection as Host Branch of the Society's 54th Annual Convention to be held in 1967, the Supreme Society chose and voted that honor to the Dallas-Fort Worth Branch. That AES Branch prevailed over the Buffalo Branch in the poll of Branches. Consequently, the 1967 AES National Convention will be held in Dallas, Texas.
15. As host of the Society's Tenth Interim Meeting (1963), the governing council chose the Kansas City Branch by poll of Branches over Miami Beach, Florida.
16. Finally, the Supreme Society ratified the enacted resolution of the Executive Board enthusiastically expressing congratulations and commendation to the Boston Branch, and its entire Boston Convention Committee, for a creditable 48th Annual Convention.

Boston Convention General Chairman and Mrs. Louis V. Gagnon at the close of a successful Convention, with sons Fred and John, and daughters Mary and Eleanor. The other Gagnon children, Barbara and William, were unable to attend.

CHESTER G. BORLET ASCENDS TO AES HELM

Chester G. Borlet, Grand Rapids Brass Company, Grand Rapids, Michigan, was elected AES National President for 1961-1962 succeeding W. Andrew Wesley, International Nickel Company, Bayonne, New Jersey, who as Immediate Past President will serve on the 1961-1962 Executive Board.

The Supreme Society also elected Manuel Ben, General Motors Corporation, Detroit, Michigan, as First Vice President; Frank O. Beuckman, Eastman-Kodak Company, Rochester, New York, as Second Vice President and Edward E. Oberland, Western Electric Company, Baltimore, Maryland, as Third Vice President.

The elected 1961-1962 National Officers were installed by Past President Ralph D. Wysong. In retiring from Executive Board membership after five years of high-grade AES service, Mr. Wysong was given a standing ovation as he took his place in the St. Joseph Valley Branch delegation as an accredited Delegate of that Branch.

President Borlet, after himself receiving his silver-plated gavel emblematic of highest AES Office from the hands of his predecessor, then presented Immediate Past President Wesley both with a gold Past National President's Pin and with an inscribed plaque symbolizing the Society's appreciation to him for effective 1960-1961 term as AES's titular head.

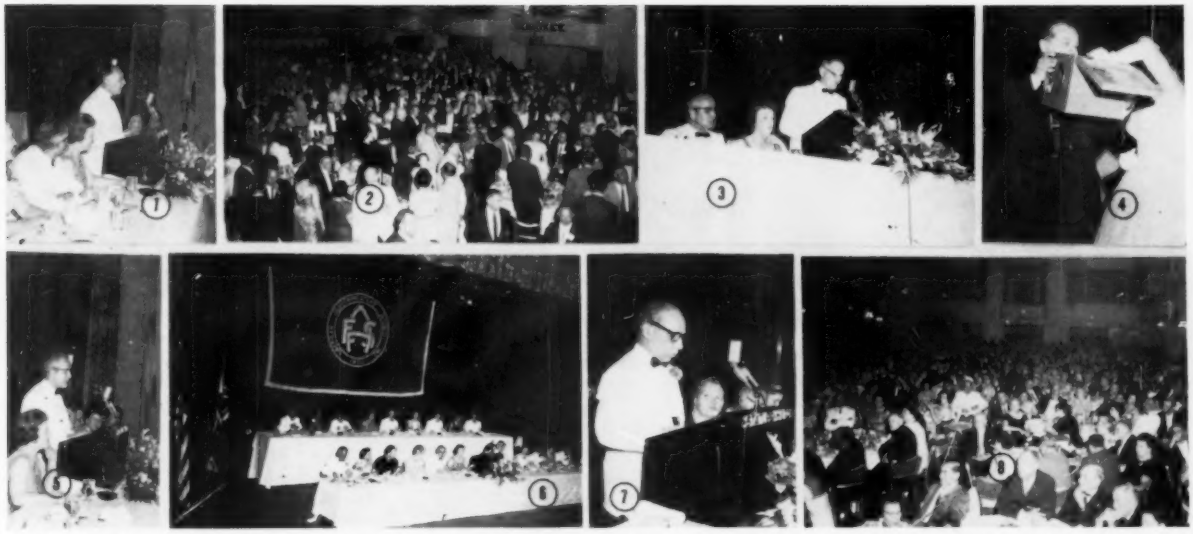
FAREWELL BANQUET CLOSES MEMORABLE CONVENTION

Packed to capacity, the Statler-Hilton's Grand Ballroom was the scene of the Boston Convention's Farewell Banquet on Thursday evening, June 22. Gaily bedecked, the Banquet Hall, including its mezzanine, accommodated a host of AES members, their families and their guests who partook of the Statler-Hilton's excellent cuisine. A two-tier Head Table occupied the stage of the Grand Ballroom. A Cocktail Party given by the MFSA preceded the Banquet.

The rendering of the National Anthems of the United States and of Great Britain (out of respect for the Society's Canadian and Australian Branches) immediately followed the filing in of the two dozen occupants of the Banquet's Head Table. The Reverend Howard P. Kellett, Vicar of Christ Church in Boston ("Old North" of Paul Revere fame), pronounced the invocation.

After dinner had been served, Convention General Chairman Louis V. Gagnon, as Master of Ceremonies, introduced the dais thus starting the evening's program. He then called upon Immediate Past President W. Andrew Wesley for a brief message as AES's head during

Parliamentarian and Convention Finance Chairman Manson Glover at work on Convention accounts.



(1) Dr. Wesley speaking at the Banquet on the final night of the Boston Convention. (2) Banqueteers standing for the National Anthems. (3) Convention General Chairman Louis V. Gagnon pays tribute to his committee co-workers. (4) Janet Swift, daughter of Dr. and Mrs. George P. Swift, draws winning number for the silver tea set. (5) President Chester G. Borlet, with Mrs. Borlet at his side, addresses the assemblage. (6) The double-tiered dais at the Banquet. (7) National Executive Secretary John P. Nichols reading resolution of commendation to the host Boston Branch. (8) The packed Grand Ballroom during the Banquet.

1960-1961. National President Chester G. Borlet next delivered his banquet address as the Society's 1961-1962 leader.

Then came the awaited moment, namely the announcement of the 1961 winner of the Society's highest administrative honor, namely the "Charles Henry Proctor Memorial Leadership Award."

As Chairman of the Selection Committee, Immediate Past President Wesley announced that the second annual bestowal of that highest non-scientific, non-technical AES Award was voted by the Committee to Dr. Harold J. Read for his leadership not only in planning and programming the "Hydrogen Embrittlement in Metal Finishing" Symposium at the Los Angeles Convention in July 1960, but also in serving effectively as AES Editor of the book on hydrogen embrittlement being published, by contractural arrangement with AES, by the Reinhold Publishing Corporation of New York.

President Borlet then delivered the $150 cash award and the handsome scroll of that high honor to Dr. Read.

National Executive Secretary John P. Nichols next read to the large AES assembly, the resolution of appreciation and commendation to the Boston Branch and to the Boston Convention Committee that had unanimously been approved at that afternoon's session of the Annual Meeting of the Supreme Society. By its enthusiastic applause, the assembly concurred with the Supreme Society's accolade.

After the closing of that impressive program thereby formally ending the Farewell Banquet and the 48th Annual Convention, the assembly danced to the late hours.

FRIDAY, JUNE 23

THE new President's traditional breakfast for National Officers and their families was held early this forenoon followed by a full morning's busy meeting of the Executive Board. During it, the 1961-1962 Law Committee Chairman was announced by President Borlet, namely Manson Glover. And as Branch representatives on the 1961-1962 Charles Henry Proctor Memorial Leadership Award Selection Committee, the Board appointed the encumbent Presidents of the AES's Toronto and Wichita Branches.

ALL AES ROADS LEAD TO MILWAUKEE, JUNE 24-28, 1962

Convention General Chairman Gagnon's report to the Board announced Convention's registration attendance at about 1270 (including children), subject to some moderate possible change after final audit.

The 48th Annual Convention, fourth held in the "Athens of America" in the Society's long history, justified four long years of planning and effort by the Boston Branch. Moreover, it auspiciously climaxed that Branch's 40th Anniversary as a chartered Branch of the American Electroplaters' Society, Inc.

Having passed into the pantheon of successful AES National Conventions, the Boston assembly made way for its successor—the 49th Annual Convention that, under the aegis of the AES's Midwest Regional Council, will be staged in Milwaukee, the so-styled "Brewing Capital in the Heart of America's Dairyland," June 24-28, 1962.

(Left) The President's Breakfast attended by the National Officers and their families, and Convention General Chairman and Mrs. Louis V. Gagnon. President and Mrs. Borlet seated at the head of table. (Right) National Officers at the first 1961–62 Executive Board meeting. Clockwise from left, Manuel Ben, First Vice President; Dr. W. Andrew Wesley, Immediate Past President; Chester G. Borlet, President; Frank O. Beuckman, Second Vice President; Edward E. Oberland, Third Vice President; John P. Nichols, Executive Secretary.

"WE LEARNED AND WE HAD FUN IN BOSTON"

by
Frances M. Hoffman
(Mrs. August R. Hoffman, Cleveland, Ohio)

The Boston Convention was delightful and the best in 1961. Each year we gasp with excitement and wonder how *so much* can take place in such a short time. We dream, we plan and we anticipate, and finally it becomes a reality. Then the jolly event comes, and shortly, it again becomes only a memory.

Little did our forefathers dream that historic Boston would repeat its famous Boston Tea Party in 1961. The Sunday afternoon tea was a lovely party in the Terrace Room Veranda, with plenty of smiles and hand shakes. Mrs. George P. Swift, our efficient Chairman, radiated friendliness and welcome to all of us. From then on, we became a vital part of lovely historic Boston.

The AES "Get Together Party" on Sunday night was a success. It was filled with chatter and laughter. Old friends were greeted and new friends were made. What fun, when we reached home with a new list of friends to be added to our former friends.

The 48th Annual Convention of the American Electroplaters' Society was opened at 10:00 a.m. on Monday, June 19, 1961, by General Convention Chairman Louis V. Gagnon of Enthone Inc. Lt. Governor Edward McLaughlin, representing Governor John Volpe, welcomed AES to the Commonwealth of Massachusetts. Mayor John F. Collins proclaimed "AES WEEK" and elaborated on its importance. Mrs. George P. Swift welcomed the Ladies again and gave them assurance that a wonderful week of fun was in store for them. Many Ladies were in attendance at the Opening Session. They considered it a privilege of great importance to be a part of the initial session.

Monday noon found all the Ladies seated in the Grand Ballroom eating delicious seafood only known to Boston. This delicacy was sponsored by the Udylite Corporation, with Mr. Robert Trees in attendance. Thank you Udylite Corporation! We were royally entertained by a beautiful film of beautiful Boston. And also, we really scooped up much information on "where" and "how" to shop. We used this knowledge as we covered the many shops in the city.

Monday night brought the Metal Finishing Suppliers' Association Ball. The "gala" affair far surpassed our expectations. The music was "dreamy." The food was delicious and plentiful and prizes were generous. Thanks to the MFSA for their continuous generosity.

Tuesday was another day filled with many activities. These activities could be realized because of the thoughtfulness and generosity of the M. E. Baker Co., Lea Manufacturing Co. and Lea Ronal, Inc. We boarded the buses in the morning, toured along the scenic North Shore with a stop for lunch at the famous Crane's Castle in Ipswich. The "great outdoors" lends itself to great appetites and the beautiful ash-trays brought many "Oh's" and "Ah's." The surrounding view was beautiful and the water and rocks most inviting, so inviting that two of the fair ladies were enchanted by the beauty and lost all sense of "time." But leave it to the Ladies! Their determination brought about a "happy landing!"

Tuesday night was a night lost to every day living. We witnessed a night of enchantment in Boston's famed Symphony Hall. Arthur Fiedler, conducting the Boston Pops Orchestra, entertained AES members and their families with music and melody. We are most grateful to the Boston Convention Committee for making these arrangements for us.

Wednesday was the famous "Outing Day." The buses took us to historic Plymouth, Mass. for a feature of the AES Convention. Only a clam-bake would fit into this setting. It was an enjoyable day for the entire family.

Thursday was another day planned carefully for our enjoyment. We toured the South Shore and enjoyed an exciting and memorable tour of historic Boston. We visited such historic landmarks as the Old State House, Benjamin Franklin's birthplace, the site of the Boston Massacre and the Boston Tea Party, Paul Revere House, the oldest frame house in Boston which was built in 1676 and many, many other colorful and famous places.

We were then treated to a very delicious lunch in the beautiful John Hancock Building. How grateful we are to the Sel-Rex Corporation. Not only are we grateful for the superb food, but for the beautiful oil painting. Also, an enlightening talk on gold and alloys was given by Mr. A. Korbelak. The wives continue to "Yearn to Learn." From group discussions following the session, the Ladies found the information most interesting as well as amusing and felt they will be able to "bargain" on gold purchases more intelligently.

Thursday evening started with a delightful cocktail party, sponsored by the Metal Finishing Suppliers' Association. No, this party was not taken for granted. All of us were aware of the thoughtfulness and generosity of the MFSA. We enjoyed immensely the food and the drinks and the "get-togetherness," which filled the room with laughter. The echoes became alive in the Grand Ballroom where the Farewell Banquet took place. Food, frolic and fun into "wee" hours proved to be an adequate climax to the Boston Convention.

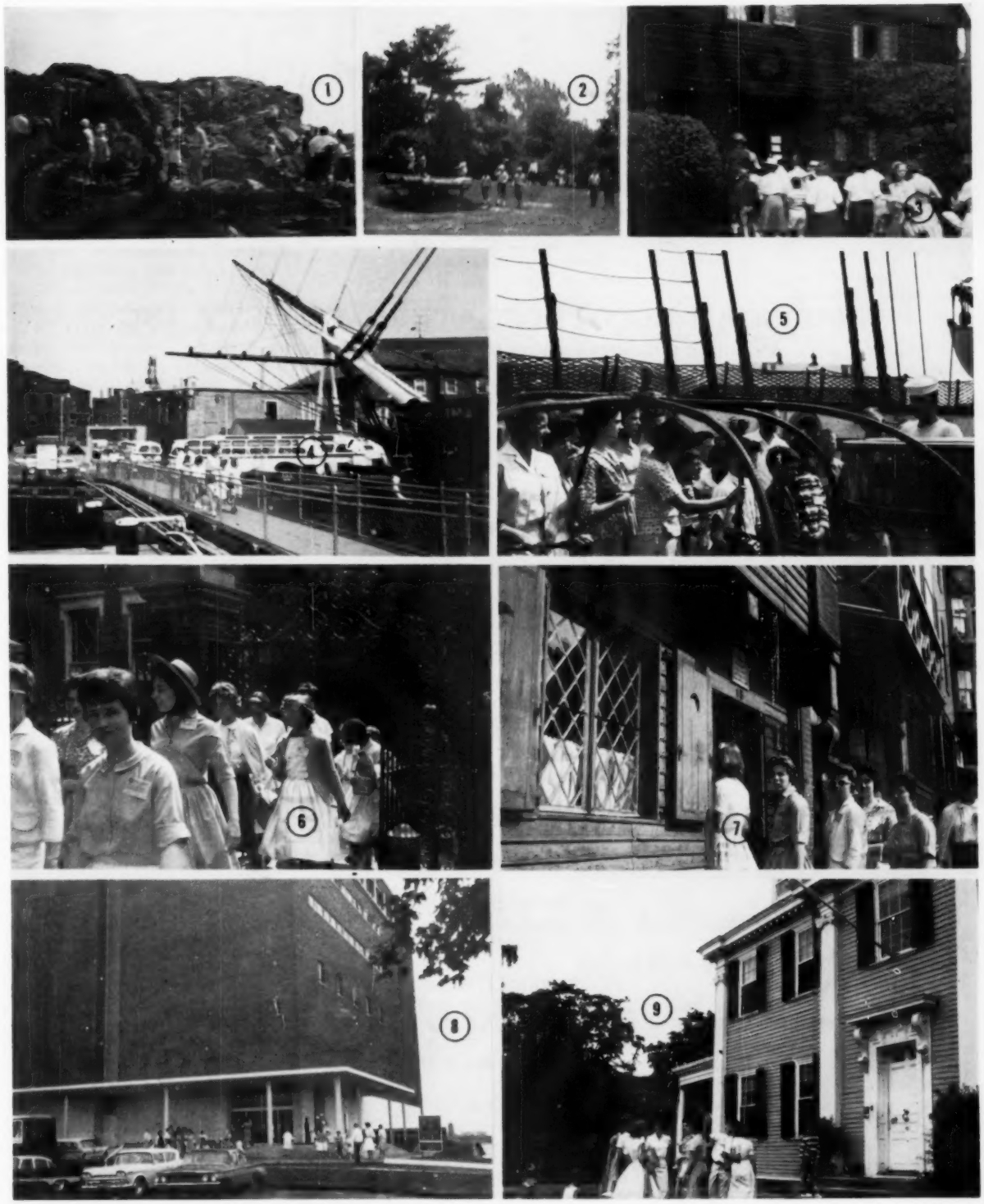
Thus ended the well organized, so ably executed, 48th Annual Convention which took place in the historic and gracious city of Boston.

Each and every lady recognized the fact that Mrs. George P. Swift and her Committee demonstrated a feeling of warmth, patience, kindness and generosity and were anxious to make everyone happy. The ladies program lent itself to many experiences which will be long remembered as additions to their historical knowledge.

Now that we are all back home wondering where the week went, we look forward to Milwaukee in 1962. Mrs. Auchter, the Ladies' chairman has already given us a sample of her charm. From her few Boston remarks, we are positive that AES' Ladies will declare the Milwaukee Convention to be best in 1962.

Bye Now—until I will be privileged again to greet you in person in Milwaukee, with Mrs. Auchter.

Delectable luncheons delighted the ladies attending the Boston Convention



YOUNG AMERICANS VIEW EARLY AMERICANA

by

JOHN P. NICHOLS, JR.

(1) The Boston Convention Children's Program commenced with an exploration of Castle Rock. (2) Pioneer Village showed how the early settlers lived in a new country. (3) The younger generation enters the Witch House in Salem. (4 & 5) Visit to the Boston Navy Yard where "Old Ironsides" was a main attraction. (6) Leaving the Museum of Old North Church in Boston. (7) Paul Revere's House was one of the highlights of the tour. (8) The youngsters found the Museum of Science instructive. (9) Youthful AES'ers at the home of the famous poet, Henry Wadsworth Longfellow.

AMERICAN ELECTROPLATERS' SOCIETY, INC.

AMERICAN BUILDING • 443-445 BROAD STREET • NEWARK 2, N. J.

♦

1961 - 1962

NATIONAL OFFICERS

CHESTER G. BORLET
Grand Rapids Brass Company
PRESIDENT

MANUEL BEN
General Motors Corporation
FIRST VICE PRESIDENT

FRANK O. BEUCKMAN
Eastman Kodak Company
SECOND VICE PRESIDENT

EDWARD E. OBERLAND
Western Electric Company
THIRD VICE PRESIDENT

DR. W. ANDREW WESLEY
The International Nickel Company, Inc.
IMMEDIATE PAST PRESIDENT

JOHN P. NICHOLS
American Electroplaters' Society, Inc.
NATIONAL EXECUTIVE SECRETARY

♦

1961 - 1962

RESEARCH COMMITTEE LEADERSHIP

DR. HAROLD J. WIESNER
Bendix Corporation
CHAIRMAN

DR. BURTON B. KNAPP
The International Nickel Company, Inc.
VICE CHAIRMAN RESEARCH

EDWARD J. KUBIS
Wyandotte Chemicals Corporation
VICE CHAIRMAN FINANCE

JOHN P. NICHOLS
American Electroplaters Society, Inc.
SECRETARY-TREASURER

DR. WILLIAM BLUM
Consultant
HONORARY MEMBER

♦

CLYDE KELLY
American Plating Company
DISTRICT SUPERVISOR

CLEVELAND F. NIXON
General Motors Corporation
DISTRICT SUPERVISOR

CLARENCE H. SAMPLE
The International Nickel Company, Inc.
DISTRICT SUPERVISOR

JAMES D. THOMAS
General Motors Corporation
DISTRICT SUPERVISOR

DR. E. L. BOWERMAN
Sylvania Electric Products, Inc.
DISTRICT SUPERVISOR

AES NEWS

SANTA CLARA VALLEY BRANCH (CALIFORNIA) TEMPORARILY CHARTERED

So as to better accommodate burgeoning membership and membership potential in the San Francisco-Santa Clara Valley region of California, two AES Branches will serve that area. By mutual agreement among San Francisco and Santa Clara principals, the San Francisco Branch will hereafter serve the Northern portion of that region and a new Santa Clara Valley Branch will serve the Southern part.

To this end, a Santa Clara Valley Branch has been temporarily chartered by the Executive Board effective July 1, 1961. It must now operate effectively for a probationary three-month minimum period before it may apply to the Board for permanent charter as AES's 62nd chartered Branch. As temporarily chartered, it embodied a nucleus of 33 members of which 28 were transferred to it from the AES's fast swelling San Francisco Branch.

DALLAS NAMED AS SITE OF AES's 1967 CONVENTION

The Society's 1967 Annual Convention will be staged in Dallas, Texas, with AES's Dallas-Fort Worth Branch as host, as a result of Supreme Society action taken to this effect at the Annual Meeting, June 22.

The Tenth Interim Meeting will be held in Kansas City on June 19, 1963, with AES's Kansas City Branch as host.

To the Chairmanship of the AES Order of Past Presidents for 1961-1962, the Order elected Past President Francis T. Eddy. He headed the Society in 1957-1958. Past President Ralph D. Wysong was named 1961-1962 Secretary.

EXECUTIVE BOARD IN TWO EXECUTIVE SESSIONS AT BOSTON NATIONAL CONVENTION

Meeting in long, busy executive session twice during the 48th Annual Convention, Boston, Massachusetts, June 18–23, 1961, the Executive Board transacted a host of AES policy business.

With then-National President W. Andrew Wesley presiding at the first such Board meeting Sunday, June 18, and with all six National Officers present as usual, the Board completed its appointments to AES Standing Committees for respective three-year terms effective June 19, 1961. Among other business, it received and acted upon a number of reports, including the preliminary budget of the 1962 Milwaukee Convention brought by Convention General Chairman Herman A. Tessmann. It passed that preliminary budget, and commended the Milwaukee Convention Committee's plans to date.

At its Friday, June 23, meeting at which National President Chester G. Borlet presided, it welcomed Edward E. Oberland, AES's new Third Vice President, and he was indoctrinated by Past President Ralph D. Wysong who then departed the Board after distinguished five-year service thereupon. It heard the new President's message to the Board and his Presidential appointments.

As instructed by the Supreme Society Annual Meeting of the prior day, the Board then appointed an eleven-man "Constitution and Bylaw Revision Committee" and designated its executive leadership. The identity of the eleven-man personnel will be carried in PLATING MAGAZINE's next issue.

The Board also laid plans for invoking the "initiative" and "referendum" provisions of the AES Constitution, as instructed by the Supreme Society's Annual Meeting, June 22, and bringing a Constitutional amendment affecting TECHNICAL PROCEEDINGS before the Supreme Society for consideration and action by letter ballot.

The 1961–1962 Research Operating Budget approved by the Annual Meeting of the Research Committee on June 21 was ratified by the Executive Board, as was an amendment of the Research Committee Bylaws. The Board also received a preliminary report from Boston Convention General Chairman Louis V. Gagnon as to that concluded Convention's attendance statistics. Subject to correction at audit, it was estimated that the Boston Convention had catered to some registered 892 men, 288 women and 76 children.

ENACTED AMENDMENTS OF AES LAW

At its Annual Meeting in Boston, Massachusetts, Thursday, June 22, 1961, the Supreme Society voted amendments to the AES Constitution and Bylaws to this effect:

1. All AES chartered Branches will hereafter be required to pay annual Per Capita Tax on all *new* members elected during the fiscal year covering the full period dating from the first day of the fiscal quarter during which elected.

2. The Branch title "Librarian" was officially and conclusively abandoned in favor of the new Branch title for the same position, namely "Branch Educational Chairman".

The Executive Board's proposal for Constitutional and Bylaw amendments increasing the rate of the annual Per Capita Tax of Active Members and the annual dues of Members-at-Large effective July 1, 1962 was referred for action to the new "Constitution and Bylaws Revision Committee".

Gordon A. Lince

Homer A. Meserve Jr.

BRANCH PRESIDENTS NAMED TO PROCTOR AWARD COMMITTEE

To round out the 1961-1962 Charles Henry Proctor Memorial Leadership Award Selection Committee already composed of 1) the donors, namely Mr. and Mrs. William O. Preston, 2) National President Chester G. Borlet, 3) National Executive Secretary John P. Nichols, 4) Chairman of the Research Committee Harold J. Wiesner and 5) Chairman of the Order of Past Presidents Francis T. Eddy, the Executive Board has now appointed to that Committee, Homer O. Meserve Jr., President, Wichita Branch and Gordon A. Lince, President, Toronto Branch.

1961 EDITION OF TECHNICAL PROCEEDINGS BEING READIED

Embodying each of the 27 technical and scientific papers on electroplating, metal finishing, organic coating and allied arts prepared by experts and presented at the Educational Sessions of the AES's 48th Annual Convention held in Boston, June 18–23, 1961, the AES's widely awaited book, TECHNICAL PROCEEDINGS (1961 Edition), is now in process of preparation. The transcript of the discussion that attended the delivery of each paper will also be included in that voluminous treasure chest of knowledge.

Every reasonable effort is being made to have the book make its appearance by mid-November 1961, as usual.

A copy of the book will then be issued to every AES member in good standing as at November 1, 1961. A limited quantity of extra copies will expectedly be available thereafter for sale to interested non-members, on an international scale, on a first come-first served basis so long as that supply lasts.

OPPORTUNITY TO AUTHORS INTERESTED IN MILWAUKEE CONVENTION PARTICIPATION

Emphasis being placed in programming the AES's Annual Convention to occur in Milwaukee, Wisconsin, June 24–28, 1962 is upon creating an educational program so significant and appealing, that few persons seriously interested in educational enrichment in electroplating, metal finishing, organic coating and other such subjects can afford to miss it.

Member or non-member authors of original, unpublished technical and scientific papers on electroplating, metal finishing, organic coating and allied arts wishing to be considered as prospective participants in that Milwaukee educational program are cordially invited to communicate either with Host Branch Educational Chairman Joseph Andrus direct (Address: 62-01 Howard Street, Chicago 48, Illinois) or through the Editor of PLATING MAGAZINE, 443–445 Broad Street, Newark 2, New Jersey.

Particularly desired for consideration are proposed original technical papers on the subjects of mechanical finishing, organic coating, pickling and etching of aluminum for finishing purposes, etc.

The Editorial Board will consider the preliminary program at its meeting in September 1961. You are consequently urged to record your availability with Mr. Andrus forthwith. State your subject (and send a preliminary abstract if possible) but please do not submit any manuscript until after the full particulars as to specifications have been sent to you.

LIFT! HELP YOUR BRANCH ATTAIN ITS MEMBERSHIP EXPANSION GOAL

IMPORTANT TO AES BRANCHES AND BRANCH SECRETARIES

1. A complete roster of your Branch Members in good standing as at June 30, 1961 as officially recorded at National Headquarters was sent to you on July 1, 1961 together with a Per Capita Tax invoice for the fiscal year July 1, 1961-June 30, 1962, and other vital data. Please check and return that list promptly.
2. Your Branch's duly elected 1961-1962 Delegates and Alternate Delegates take office at the first Branch Meeting immediately following the June 22, 1961 Annual Meeting (Boston) of the Supreme Society. A Return Sheet will reach you about September 1 from National Headquarters. In conformity with AES law you will be required to identify and certify these 1961-1962 Delegates and Alternate Delegates for accreditation by the 1961-1962 Credentials Committee. Your executed Return Sheet duly signed by your Branch President and Branch Secretary must be at National Headquarters on or before November 6, 1961.
3. You have received a Return Sheet to convenience your report to National Headquarters as to your elected 1961-1962 Branch Officers. If you have not yet executed and returned yours, please do so by return mail.
4. Your Branch's duly elected and accredited Delegates will receive early this Autumn respective return sheets via which your Branch, if it so chooses, may nominate candidates for 1) the 1961-1962 AES Scientific Achievement Award and 2) AES Honorary Membership in compliance with the Rules and Regulations governing those Awards. Nominations will close on the exact date specified in that communication.

FUTURE MEETINGS

Education is the business of AES. For National, Regional and Branch educational and other AES meetings ahead, see PLATING's section titled FUTURE MEETINGS herein.

ADAMS DISPLAY AT HARVARD MARKS CENTURY OF NICKEL PLATING

Memorabilia from the collection of Dr. George Dubpernell of Metal & Thermit Corporation relating to the discovery of nickel plating at Harvard University by Dr. Isaac Adams Jr. is on display at Harvard University in the Alston Burr Lecture Hall. Platers had the opportunity to visit the display during the recent AES Boston Convention. (1) Close-up of some of Dr. Adams' early apparatus. (2) Display cases containing the collection. (3) The Alston Burr Lecture Hall. The Adams display is in the rotunda at the left.

SUPPLEMENTARY BOARD AND PRESIDENTIAL APPOINTMENTS TO AES 1961-1962 COMMITTEES

Supplementing its prior appointments, The Executive Board has now named the following to these AES Boards and Committees, for three-year terms unless otherwise specified.

EDITORIAL BOARD

Harold W. Scott (Baltimore-Washington Branch) to fill the unexpired term to June 24, 1963 of Edward E. Oberland, AES's recently elected Third Vice President.

EDUCATIONAL COMMITTEE

Donald A. Swalheim (Member-at-Large) for term July 1, 1961–June 15, 1964.

National President Chester G. Borlet has made the following Presidential appointments for the 1961–1962 fiscal year:

LAW COMMITTEE

Manson Glover (Boston Branch), Chairman
Leslie L. Diveley (Milwaukee Branch)
Louis V. Gagnon (Boston Branch)
William J. Neill (Columbus Branch)

CREDENTIALS COMMITTEE

Joe H. Shockcor (Lancaster Branch), Chairman
Robert L. Garrett Jr. (Kansas City Branch)
Kergan Wells (Toronto Branch)

PAPER AWARDS COMMITTEE

Dr. Martin S. Frant (Lancaster Branch), Chairman
B. C. Case (Chicago Branch)
Thomas C. Henner (Cleveland Branch)

EXHIBIT AWARDS COMMITTEE

Edward E. Oberland (Baltimore-Washington Branch)

I. M. Weiss (Detroit Branch) has been elected Chairman of the 1961-1962 AES Membership Committee. Dr. Harold J. Wiesner (St. Joseph Valley Branch) has been elected Chairman of the 1961–1962 Research Committee with Dr. Burton B. Knapp (Newark Branch) as Vice Chairman for Research and Edward J. Kubis (Detroit Branch) as Vice Chairman for Finance. Past President Herberth E. Head has been elected 1961–1962 Chairman of the Honorary Membership Awards Selection Committee. Leadership of other 1961–1962 AES Committees will be announced in PLATING MAGAZINE as promptly as elected.

TALMAGE R. BOGGESS WINS PAST PRESIDENTS AWARD

At its Annual Meeting held in Boston, Massachusetts, June 19, 1961, the Order of Past Presidents of American Electroplaters' Society, Inc. voted its annual "Order of Past Presidents Award" to Talmage R. Boggess, Vinton, Virginia, a member, Delegate and Past President of the AES's Blue Ridge Branch.

Inaugurated in 1960, the Award is annually voted by the Order to a stalwart of the Society for outstanding service to AES. It was awarded to Mr. Boggess not only for his leadership in the creation in 1958 of AES's now burgeoning Blue Ridge Branch but also for other noteworthy services to the Society and to the AES Dixie Region. The Award was presented to him in behalf of the Order by then National President W. Andrew Wesley at the Annual Meeting of the Supreme Society in Boston, June 22.

Five new AES Honorary Members were elected by the Supreme Society at its Annual Meeting held in Boston, Massachusetts, June 22, 1961, namely Past President William J. Neill (Columbus Branch); Myron B. Diggin (Newark Branch); Manson Glover (Boston Branch); Raymond J. O'Connor (Bridgeport Branch) and Daniel Gray (Syracuse). They are pictured above in the foregoing order. Their election to coveted AES Honorary Membership brings the total living number of that select circle to nineteen.

SIX MIDWEST BRANCHES COLLABORATING TO PRODUCE AES's BANNER 49th ANNUAL CONVENTION

AES members, their families, their guests, including learned men in electroplating, metal finishing and allied arts from foreign lands, will converge from all directions, via all means of transportation, upon the City of Milwaukee, Wisconsin, June 24-28, 1962 to attend the 49th Annual Convention of American Electroplaters' Society, Inc. to be held at the municipality's famed Schroeder Hotel hosted for the National Society by its six-Branch Midwest Regional Council (Chicago, Milwaukee, Mississippi Valley, Rockford, St. Joseph Valley and St. Louis) with the Milwaukee Branch as Host Branch.

Spelled "Schroeder" but pronounced "Shraider" (and it is lesé-majeste to say it otherwise within Milwaukee's periphery), that noted hostelry, site of three prior AES Annual Conventions in AES's 52 year history, will house what may well become the Society's largest annual conclave since its memorable GOLDEN JUBILEE CONVENTION held in Detroit in June 1959. Six dynamic AES Midwest Branches are collaborating to accomplish this objective.

There will be a large, noteworthy Educational Session Program as main fare and principal purpose of the 49th Annual Convention. There will be an appealing Ladies Program. There will be a stressed and well-fashioned Childrens Program. There will be abundant and unique Plant Tours. There will be "off duty hour" relaxation, fellowship and fun. There will be significant AES Branch and Committee meetings—and the Supreme Society will conduct its annual legislative session there governing the Society to continued progress.

With Convention General Chairman Herman A. Tessmann (Milwaukee) at the helm, and with Past National President Ralph D. Wysong (St. Joseph Valley) and Leonard Weeg (Rockford), Assistant General Chairmen, as his principal aides, the departmentized Host Branch Convention Committee is loaded with the brains and skill of the Chicago, Milwaukee, Mississippi Valley, Rockford, St. Joseph Valley and St. Louis Branches of AES's Midwest Regional Council—the first time in AES history that any AES National Convention has been hosted by an AES Regional Group instead of by a single AES Host Branch.

So start planning now to be among those who will fly, motor or railroad to Milwaukee, the Brewing Capital in the heart of America's Dairyland, to attend AES's 49th Annual Convention. In educational enrichment your investment will bring rich reward. Fellowship and relaxation for you and yours will be additional dividends.

(Top Photograph) Milwaukee is one of the most progressive port cities on the Great Lakes. Whereas most port cities are established at the confluence of a river or stream with one of the lakes, Milwaukee's inner harbor is built along three separate rivers. The port and city are located where the Milwaukee, Menomonee and Kinnickinnic rivers flow into Lake Michigan. (Bottom Photograph) In July 1955, Milwaukee County dedicated its new $3,500,000 air terminal building at General Mitchell Field—proclaimed by many national aviation authorities as the most beautiful and functional building of its kind in the country. It serves a landing area two miles long and one and one-quarter miles wide.

INDICATE A 820. ➤

LEA

ABRASIVE FINISHING METHODS

CHROMIUM

HARD CHROME HEAVY PLATE

In the metal finishing field, chromium mostly appears as an electrodeposit. Decorative plates of chromium, requiring little or no finishing, will be treated separately.

In recent years, however, heavy deposits of chromium have come into wide use for wear-resistant purposes. With such deposits, chromium can be treated as if it were a base metal and this section will deal with the polishing and buffing methods suggested for bringing these so-called heavy hard chrome deposits to the required degree of finish.

FLEXIBLE POLISHING...Where both fast cut and a smooth finish are wanted, **Grade "E" Lea Compound** is used for flexible polishing of hard chrome plate. Sewed muslin, felt wheels, or loose buffs can be used, depending upon the amount of abrasion desired. Where heavy cutting is required, **Ad-Lea-Sive** is ordinarily used as a sizing on the sewed buffs or felt wheels. When small defects, burns, etc. are to be removed and the surface brought to a uniform finish, use a flexible polishing operation with **Grade "C"** or **Grade "B-31" Lea Compound** on sewed buffs or loose muslin buffs.

SATIN FINISHING...This is a final finish for hard chrome plate, produced at a speed of 5000 sfm. Use **Grade "N" Lea Compound** on loose muslin buffs or on **Lea String Wheels.** Finer and coarser grades of **Lea Compound** are available.

BRIGHT FINISHING...To produce this finish, showing no surface defects, use **Grade 305-A** or **304-B Learok** (bar compositions) or **Lea Liquabrade Grade 7370** (liquid composition) with the same buffs and wheel speed as for satin finishing.

BUTLER FINISHING...This finish can be obtained with **Grade "FG" Lea Compound** on a packed loose muslin buff at 5000 sfm following the bright finishing operation.

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ABRASIVE FINISHING
CHROMIUM
(HEAVY CHROME PLATE)

Lea-Ronal

NICKEL PLATING PROCESSES

NICKEL-GLO

BRIGHT BARREL NICKEL PROCESSES

NICKEL-GLO BA A *hot high speed* bright barrel process producing brilliant ductile deposits.

NICKEL-GLO C A versatile room temperature bright barrel process.

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BRIGHT NICKEL*

A newly improved versatile bath exhibiting exceptional leveling, ductility and chrome receptivity. The same basic addition agents may be used with either mechanical or air agitation, or no agitation.

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Low Stress nickel designed for the electronic and allied industries. Ideally suited for printed circuits and other applications where controlled stress is required.

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The Lea-Ronal Research and Technical Staff is constantly studying electroplating problems and working on the development of new processes to improve the quality of plated products...to broaden the uses of plating... and to reduce the cost of plating. Why not bring your plating problem to the attention of our Staff?

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BIBLIOGRAPHY OF METAL FINISHING WASTES, 1959 AND 1960

by D. GARDNER FOULKE

The number of articles published on plating waste treatment and related analytical methods is not as large as was the case a few years ago. Although fewer words have been written, interest in waste treatment is not lessening as shown by activities of legislative and regulatory agencies and public pressure as reflected by the activities of certain groups and at the National Conference of Water Pollution held in Washington in December 1960 at the call of President Eisenhower.

Most new plating facilities are planned with good housekeeping and waste treatment in mind and many are finding water conservation and chemical saving are worthwhile objectives.

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INTERSOCIETY NEWS

J. G. CARRIQUE

CARRIQUE ELECTED TO MFSA PRESIDENCY

J. G. Carrique, president of Alloycraft, Ltd., Montreal, Canada, was installed as president of the Metal Finishing Suppliers' Association, Inc., at the Annual Meeting of the Association, held June 19 at the Hotel Statler-Hilton, Boston, Mass.

This is the first time that a Canadian has been elected to the presidency of the Association, whose membership is made up of the principal manufacturers and distributors of electroplating and metal finishing supplies and equipment in the United States and Canada. In addition to Mr. Carrique's company, other Canadian member companies are: Armalite Co., Ltd., Toronto; Canadian Hanson & Van Winkle Co., Ltd., Toronto; D & S Aviation Co., Ltd., Pont Viau, Quebec; Lea Mfg. Co. of Canada, Scarborough, Ontario; W. W. Wells, Ltd., Toronto, Canada.

Other officers and trustees of the Metal Finishing Suppliers' Association, Inc., installed with Mr. Carrique at the June 19 meeting are: Dr. H. L. Kellner, Lea Mfg Co., first vice president; R. M. Norton, Hanson-Van Winkle-Munning Co., second vice president; King Ruhly, Michigan Chrome & Chemical Co., third vice president; J. E. Trumbour, *Metal Finishing*, treasurer; E. A. Blount, *Products Finishing*, executive secretary; F. P. Green, Crown Rheostat & Supply Co., past president; and (trustees) J. A. Cairns, Allied Research Products, Inc.; J. M. Davidson, Pennsalt Chemicals Corp.; R. C. Treves, Udylite Corp.; R. E. Belke, Belke Mfg. Co.; S. M. Goble, Federated Metals Div. American Smelting and Refining Co.; H. D. McLeese, Metal & Thermit Corp.

The Metal Finishing Suppliers' Association, Inc., the only trade association of manufacturers and distributors in the finishing industry, is now in its 38th year of service to the industry. The Association was incorporated in 1951. Prominent among the principal projects of the Association is its promotion of the idea of joint hospitality receptions at various local, regional and national gatherings of the American Electroplaters' Society. The Association counts as one of its major accomplishments the establishment of an improved climate of doing business in the finishing industry.

♦

MARLETTE NEWLY ELECTED PRESIDENT OF NAMF

Edward N. Marlette, general manager of Marlette Plating Co., Inc., 200 Cornwall Ave., Buffalo, New York, was elected president of the National Association of Metal Finishers at the convention of the National Association of Metal Finishers, at Boston's Statler Hilton Hotel, June 16–19. He succeeds Robert L. Giesel, Adolph Plating, Inc., of Chicago.

Mr. Marlette, who received his BA from Dartmouth in 1941, attended Nichols School and Bennett High School.

He was elevated to the NAMF presidency from first vice president. Mr. Marlette figured prominently in the publishing of the NAMF Management Manual. He has also served as chairman of the NAMF educational committee for two years.

Active in civic and community organizations, Mr. Marlette is a member of the Buffalo Chamber of Commerce, National Assn. of Manufacturers, Board of Managers at Nichols School, Saturn Club, Dartmouth Alumni Assn. of Western New York, Cherry Hill Country Club, Amherst Little League, and the Buffalo Branch of the American Electroplaters' Society.

The rest of the NAMF board of directors: first vice president, James E. Cogan Jr., Globe Plating Co., Philadelphia; second vice president, Harold E. Coombes Jr., Crown City Plating Co., El Monte, Cal.; secretary-treasurer, Frank Kaiser, Long Island Mechanical Plating Co., Woodside, Long Island; assistant secretary-treasurer, Sal Novelli, Service Plating Co., Brooklyn; immediate past president, Robert L. Giesel, Adolph Plating, Inc., Chicago; E. Paul Koeckritz, L. A. Parkerizing, Los Angeles; John T. Hyduke, Durable Plating Co., Cleveland; Glenn H. Friedt Jr., United Platers, Inc., Detroit; William R. Crawford, Chrome-Rite Corp., Chicago; J. William Carlson, Arrow Plating Co., Chicago; A. T. Leonard, Superior Plating, Inc., Minneapolis; Jules Horelick, Allied Metal Finishing Co., Baltimore; Curtis M. Varland, Varland Metal Service, Inc., Cincinnati; and Napoleon A. Vigeant, M & V Electroplating Co., Newburyport, Mass.

♦

Edward N. Marlette

A. E. Torney

TORNEY GIVEN NAMF AWARD OF MERIT

Austin E. Torney of Chicago, received the NAMF Award of Merit in absentia at the National Association of Metal Finishers' recent Boston Convention "in recognition of meritorious service and achievement on behalf of the job metal finishing industry." The award was presented to Mr. Torney's representative, W. C. Crawford, Chicago, who accepted on his behalf. Presented annually, this award was one of three given by the sponsoring National Association of Metal Finishers.

Mr. Torney was cited for his effort against the payment of royalties by job metal finishing firms in the 1930's on sales produced from chromium plating solutions. He has served as Legal Counsel for the Chicago Electro-Platers' Institute for over a quarter of a century.

♦

ANODIZED ALUMINUM CONFERENCE PLANNED IN ENGLAND

The Aluminium Development Association, with the University of Nottingham Department of Metallurgy, is organizing a residential conference at the University in Nottingham, England from September

12 to 14, 1961. There will be technical sessions on the afternoon of Tuesday, September 12, and morning and afternoon sessions on Wednesday. The conference will end officially after breakfast on Thursday.

Fifteen papers, by British and foreign authors, will be presented. They will be grouped into six sessions under separate headings, and to make the best use of time available will be printed and distributed well before the conference; in this way the appropriate papers can be briefly introduced at each session and the rest of the time devoted to discussion and authors' replies.

Accommodation will be in Cripps Hall, a new University building, and the complete charge for the Conference is 5 guineas; for two nights only—4 guineas; and for meals only—3 guineas for each person. There is limited accommodation for members of the conference who wish to bring their wives.

PROGRAM OF SESSIONS

Session I. Anodizing From The User's Viewpoint

1. Performance and Properties of Anodic Finishes
   Mr. J. M. Perfect (Anodizing and Platings, Ltd.)
2. Control of Quality of Anodic Finishes
   Mr. J. G. Simmons (Acorn Anodizing Co., Ltd.)
3. Current trends in Materials for Anodizing
   Professor J. W. Cuthbertson (University of Nottingham) and Mr. J. C. Bailey (Aluminum Development Association)

Session II. Special Surface Characteristics

4. Bright Anodized Aluminum Surfaces
   Dr. B. A. Scott and Mr. H. M. Bigford (The British Aluminium Co., Ltd.)
5. Color and texture in anodic finishes

Session III. Current Views on Anodic Coatings

6. Theory of Formation of Oxide Coatings on Aluminium
   Dr. J. F. Murphy and Mr. C. E. Michelson (Olin Mathieson Chemical Corporation)
7. Characteristics of Barrier type Coatings for Electrolytic Capacitors
   Mr. B. W. Franklin (The Plessey Company Limited)
8. Study of the Growth Process of Primary Films on the Surface of Aluminium
   Professor Dr. H. Ginsberg and Diplom-Physist W. Kaden (Vereinigte Aluminium-Werke AG, Bonn)

Session IV. Industrial Applications

9. Anodic Finishes for Decorative Applications
   Mr. T. E. V. Stephenson (Alcan Industries, Ltd.)
10. Anodic Finishes for Electrical Insulation
    Mr. J. J. Lee (Aluminium Development Association)
11. Anodic Finishes for Wear Resistance
    Mr. W. J. Campbell (Hard Aluminium Surfaces, Ltd.)

Session V. Theory of Related Processes

12. Theoretical Aspects of Electrolytic and Chemical Polishing
    Mr. A. W. Brace and Mr. J. M. Kape (Aluminium Laboratories, Ltd.)
13. Theory of Dyeing Anodic Finishes
    Dr. C. H. Giles (Royal College of Science and Technology, Glasgow)

Session VI. Advances in Anodizing Techniques

14. Some Pre-Anodizing Techniques for Decorative Work
    Mr. V. F. Henley (W. Canning & Co., Ltd.)
15. Techniques for Architectural Anodizing
    Captain J. Fox-Williams (Williams & Williams, Ltd.) and Mr. H. L. Watts (Crittall Manufacturing Company, Ltd.)

Forms of application, containing full details of fees, times, etc., can be obtained from The Secretary, The Aluminium Development Association, 33 Grosvenor Street, London, W. 1, England.

WESTERN RESERVE HAS NEW ELECTRONIC LITERATURE SEARCHER

Western Reserve University's School of Library Science, through the Center for Documentation and Communication Research and in cooperation with The General Electric Company and The American Society for Metals was host May 24 to a group of science editors, library journal representatives and business and technical magazine editors for the pre-view of the new GE 225 all purpose computer recently installed at the Documentation Center on the campus.

The new General Electric information searching system—GE 225—consists of a transistorized general purpose computer with an 8,192-word magnetic core storage memory and special programming features for conducting literature searches. It is equipped with a dual magnetic tape handler and tape controller, a high-speed punched card input and an electric typewriter output. It is the first of its type to be installed anywhere in the world for purposes of literature searching.

Since 1955 Western Reserve University has pioneered a far-reaching program to improve library methods in its new Center for Communication and Documentation Research under the leadership of Dean Jesse H. Shera.

The Center's chief outside sponsor from the start has been the American Society for Metals located at Novelty, Ohio. Working with an electronic research machine, designed and nurtured by J. W. Perry, the Center's first director, and known as the Western Reserve University Searching Selector, research-minded ASM associates and the Center's pioneers opened up a whole new field of abstracting, encoding, programming and searching. In studying the Western Reserve University Searching Selector, electronics engineers from General Electric Company agreed that the machine's principle was workable and that a faster, more efficient machine could and should be developed. Both Dean Shera and Mr. Kent worked closely with them in designing and developing the GE 225 which is about 2000 times faster than the original machine developed by Mr. Perry.

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A bonafide example of the advertiser's proposed mailing must first be received and screened by PLATING. If mailing assignment is accepted thereby, the entire quantity must be shipped by the advertiser to PLATING MAGAZINE's Newark, N. J. office, pre-stuffed, for PLATING addressing and mailing. No mailing of less than a thousand pieces is acceptable. For further, fuller details, including costs, write or call Thomas W. Lowe, Production Manager, PLATING MAGAZINE, American Building, 443-445 Broad Street, Newark 2, N. J. (Telephone HUmboldt 2-3400).

Photograph courtesy of Plating Management

NAMF MAN OF THE YEAR. L. to r.: Alfred T. Marinaro, executive director of Masters' Electro-Plating Association and close associate of the late Silvio C. Taormina in whose honor award was named; Frank Kaiser, award recipient; Mrs. Kate Taormina of New York, widow of the late industry leader; and NAMF awards chairman Curtis M. Varland of Cincinnati who made the presentation to Mr. Kaiser at recent Boston convention of the National Association of Metal Finishers.

GRAHAM AND PINKERTON PRESENTED AWARD AT ASTM MEETING

A. Kenneth Graham and Henry L. Pinkerton, president and chemical engineer, respectively, Graham, Savage and Associates, Inc., Jenkintown, Pa., received the Sam Tour Award at the Awards Luncheon, Chalfonte-Haddon Hall, June 28, during the 64th Annual Meeting of the American Society for Testing Materials at Atlantic City, N. J. This annual award is given to the author or authors of a technical paper, published by the Society, of outstanding merit in the field of improvements and evaluation of corrosion testing methods.

Dr. Graham and Mr. Pinkerton received the award for their paper on "Standardizing the Preparation of Electrodeposits on Test Panels for Corrosion Testing," which was published in *Proceedings*, American Society for Testing Materials, Vol. 59, (1959).

Dr. Graham is a native of Philadelphia, Pa. He received his BS degree in 1919, ChE degree in 1923, MS degree in 1924, and PhD degree in electrochemistry in 1927 from the University of Pennsylvania, where he taught chemistry and chemical engineering for 14 years. He served as consultant to the War Production Board and the Manhattan Project during World War II. Dr. Graham has been president of Graham, Savage & Associates, Inc., since it was formed in 1944.

Dr. Graham has been a member of ASTM and Committee B-8 on Electrodeposited Metallic Coatings and Related Finishes since 1941, and is active in a number of subcommittees of B-8.

He has published many technical articles and served as editor-in-chief of the *Electroplating Engineering Handbook*, which bears his name. He also holds several patents. He is a member and past-executive secretary of the American Electroplaters' Society; was a three-time winner of the Society's Gold Medal for technical publications, and a recipient of the AES Scientific Achievement Award. His other Society affiliations include the American Chemical Society, American Institute of Chemical Engineers, the Electrochemical Society, Sewage and Industrial Wastes Assoc. of Penna., Institute of Metal Finishing, and Association of Consulting Chemists and Chemical Engineers.

Mr. Pinkerton has published a number of technical articles and served as assistant editor of the *Electroplating Engineering Handbook*. He is a licensed professional engineer in Pennsylvania. He is a member of the Electrochemical Society and the American Electroplaters' Society; Tau Beta Pi, Alpha Chi Sigma, Sigma Xi, and Delta Chi fraternities.

At Imperial-Eastman Corporation, manufacturer of hydraulic and pneumatic systems components, A. J. Panico, metal cleaning dept. mgr., and D. McCormack, quality control mgr., compare finishing results with R. Dinsmore, Diversey D-Man.

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Every dollar you can cut from finishing costs puts your firm in a better competitive position. Diversey DS-9 not only cuts finishing costs, it improves the appearance of your products with a single immersion. On many parts DS-9 Bright Dip eliminates the need for more costly buffing, electropolishing or grinding. Puts a brilliant finish on hard-to-polish, intricate shape parts yet uses no electric current (another area where you can cut costs). For removing heat treating scale, weld scale, scale from forgings, or simply to provide superior finishing, you'll find Diversey DS-9 Bright Dip gives you the finish you need at a cost you'll appreciate. Also you can now bulk dip and save money.

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August 8, 1960
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C.D. Memel

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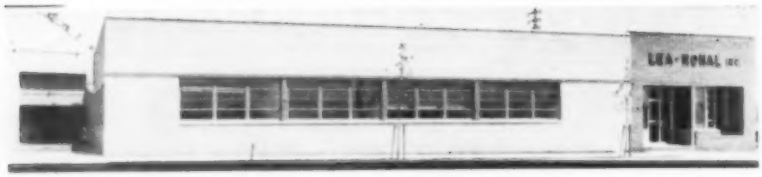

LEA-RONAL HAS NEW PLANT AND LABORATORIES

Lea-Ronal, Inc., 130-19 180th Street, Jamaica, New York has moved into modern and greatly enlarged quarters with facilities for broadening its service to electroplating plants and departments.

The total 10,000 sq ft floor area consists of office, testing and analytical laboratories, research and development laboratories, pilot plating unit, precious metal refining unit, solution manufacturing area and storage.

The analytical laboratory has facilities for analyzing and checking customers' solutions. The test laboratory is equipped to make physical and plating tests and to evaluate customers' solutions.

In the research and metallurgical section, the company has a pilot plating unit where simulated production runs can be made on customers' articles with the various Lea-Ronal solutions. Here, too, tests are made on solution improvements and on new developments in plating. Pilot plating tanks of 50-gal capacity are available for nickel, copper, brass and silver, whereas smaller units are utilized for gold, gold alloys, silver alloys and precious metals. The company has arranged facilities for refining of precious metal plating solutions for their customers.

Officers of Precision Castings Company (back row) and representatives of the award winning companies.

PRECISION CASTINGS PRESENTS AWARDS TO SUPPLIERS

The second annual vendor meeting of Precision Castings Company was held at the Sheraton-Cleveland Hotel. Precision once each year fetes its key vendors who supply the materials, metals and finishing which are used in the production of its castings.

At the luncheon on June 12 over 67 individual suppliers were represented and over 100 people attended. This year Precision inaugurated its "Supplier of the Year Award" which was presented to 25 companies who have been outstanding suppliers of various commodities during the 1960 calendar year. These companies, according to Wm. Brammer, Vice President—Marketing, ". . . helped us out beyond normal buyer-vendor relationships when we needed help." The suppliers were judged upon four basic points of performance during a year: Quality, Capacity, Service and Price. The metal finishing vendors selected for special awards were: Bechtel-McLaughlin, Inc., Manufacturers Plating Company, Advance Plating Company and Jeavons Japanning Company.

MAGNUS CHEMICAL CONDUCTS INDUSTRIAL CLEANING SEMINAR

More than 16 countries were represented, recently, in an international industrial cleaning seminar conducted in New York City by Magnus Chemical Company of Garwood, N. J. Bringing together most of the Magnus Chemical Company international family of independent, autonomous firms, representing a major portion of the free world, the week-long seminar was targeted at an interchange of information, ideas and problem solutions that would benefit the entire organization.

The formula for the international organization of Magnus was devised by W. M. Campbell, president of the company, on the basis of a simple concept—cooperation and coordination, without exploitation. The firms, capitalized by local national interests and managed independently of Magnus (U. S.), operate under the Magnus name on the basis of low licensing fees and small royalties. All manufacturing and marketing are handled strictly as local national operations.

Companies from Alaska, Argentina, Aruba, Brazil, Canada, Cuba, France, Hawaii, Italy, The Netherlands, Norway, Puerto Rico, South Africa, Spain and Switzerland attended the seminar. There also was a representative of countries of the Middle East.

The entire assemblage, following a Thursday plant inspection at Magnus' Garwood headquarters, flew to Montreal, Canada, and inspection of the Trans-Canada Airlines engine cleaning installation there. TCA is one of the first airlines to adopt a cleaning system entirely equipped with automatic Magnus equipment and chemicals in their multi-million-dollar plant.

♦

BARRETT CHEMICAL APPOINTS BLUM A DISTRIBUTOR

The Barrett Chemical Products Company, Inc., Shelton, Connecticut has announced the appointment of Don Blum & Company, Inc., 1160 Lexington Avenue, Rochester 6, New York as a distributor of the Barrett Sulfamate Nickel plating process on a non-exclusive basis in the upper New York state region. Other currently active distributors in New York state are the Udylite Corporation, Austin F. Fletcher, Inc. and W. M. Fotheringham.

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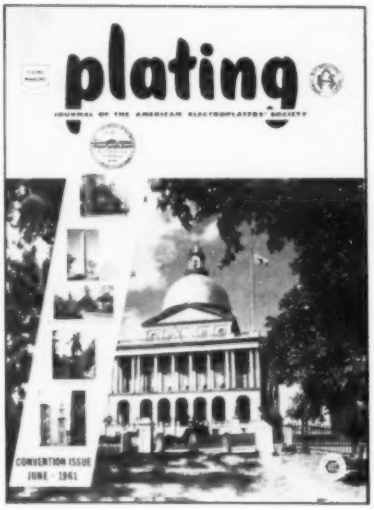

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CHROMIC ACID, flake type, 100 lb drums 31.00

COPPER CYANIDE, 100 lb drum 65.90

COPPER SULFATE, 100 lb bags, per cwt 15.50

NICKEL CHLORIDE, freight allowed, 100 lb 45.00

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John R. Weyls, sales engineer, R. O. Hull & Co., Inc., Rocky River, Ohio, won the Distinguished Salesman's Award of the Cleveland Sales Executives' Club recently. Mr. Weyls was also acclaimed as The Enthone Products Salesman of 1960. The D. S. A. "Oscar" and its accompanying cash prize were presented at the club's Ninth Annual Award Banquet. L. to r., A. W. Ardizone, club president; John R. Weyls, Mrs. Weyls and A. R. Tefft, Enthone.

ORIGINAL OIL PAINTINGS COMMISSIONED BY SEL-REX

A series of six original oil paintings, depicting man's relationship to gold through history, has been commissioned by Sel-Rex Corporation of Nutley, N. J., according to an announcement from Morris M. Messing, president. The paintings, which are reportedly being done by famous American Artists, initially will be used to illustrate a four-color, 2-page insert advertising campaign promoting Sel-Rex's patented heavy gold electroplating process. Lithographic reproductions on parchment stock, suitable for framing and store-window displays, are said to be available free on request.

The first painting, currently appearing in national trade media as an advertisement, is entitled The Alchemist, by Paul Lehr. Mr. Lehr, who holds a Bachelor of Fine Arts degree from Wittenberg College and has also studied at Pratt Institute, has done work for Shell Oil, Raybestos-Manhattan, A.C.F., Saturday Evening Post, New American Library, Proctor-Silex, and many other companies of national repute. His work has also been on display in several prominent museums and galleries and is owned by many private collectors throughout the world.

"Gold and Man" Great Artists Series, is said to illustrate only articles and objets d'art which are authentic and historically documented. Preparation for each painting entailed many hours of research, as well as the photographing of artifacts on display in various museums, according to Sel-Rex.

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WELLS FORMS NEW WEST COAST FIRM

Harold C. Wells has sold his interest in Crown Chemical and Engineering Co., where he was one of the originators, co-owner and vice president, and has started a new company in Los Angeles.

Howard Griesbach, director of manufacturing of Flexonics, Bartlett, Illinois, left, congratulates James F. Zievers, vice president of Industrial Filter & Pump Mfg. Co., Cicero, upon the successful completion and start-up of new super-compact waste treatment plant. In the background is a section of the control console for the plant. The system fits into a space one-fourth that of conventional plants of same purpose, is capable of handling 360,000 gallons a day of toxic wastes and currently is producing an effluent which is said to be superior in all respects to the raw water supply available in the area.

The new firm furnishes equipment, chemicals, materials and supplies, and engineering and installation services to the metal finishing, electroplating, process and industrial fields.

Personnel and affiliates, well known in California and the West Coast, are widely

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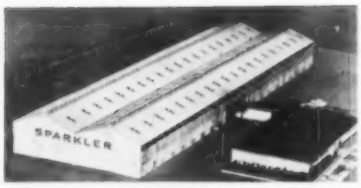

Sparkler Manufacturing Co., engineers and producers of custom and standard diatomite filtration units for over 36 years, and originators of the horizontal plate filter, is now in full production at their new 70,000 sq ft plant in Conroe, Texas. Their new plant features a streamlined, assembly-type production line built around the latest modern equipment.

experienced in furnishing individual equipment for complete system installations with "one point" responsibility. This includes: specification, design, engineering, procurement, supply, assembly, total installation and initial operation.

The H. C. Wells Company's area of activities will be principally on the West Coast.

♦

NATIONAL ULTRASONIC MOVES TO LARGER PLANT

National Ultrasonic Corp. has moved to larger and more modern manufacturing facilities. The move was announced by L. R. Jeffrey, president of the company.

This move indicates the rapid expansion of not only National, but the acceptance of ultrasonics as a long awaited process, states Mr. Jeffrey. This new plant will provide approximately 15,000 sq ft of manufacturing and 3000 sq ft of office and engineering area.

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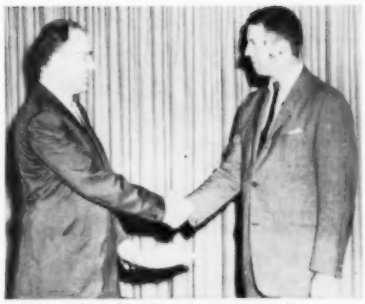

Peter K. Bloch (left), president of Branson Instruments, Inc., and Wellington Vandeveer, president of Circo Corp.

BRANSON INSTRUMENTS ACQUIRES CIRCO

Peter K. Bloch, president of Branson Instruments, Inc., Stamford, Conn., and Wellington Vandeveer, president of Circo Corporation, Clark, N. J., recently announced that Branson Instruments has acquired all outstanding Circo stock. Circo Corporation will continue to operate at its present location; no change in management or personnel is contemplated.

Founded in 1923, Circo now employs over 80 people at its New Jersey facility, with offices and warehouses in all principal U. S. cities. According to company spokesmen, the Circo field organization will be integrated with Branson's staff of sales engineers

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PATENT INFORMATION PAMPHLETS AVAILABLE FROM PATENT OFFICE

Two pamphlets have been issued by the Patent Office of the Commerce Department which were developed and prepared for use by those who are faced with questions about patents, and where information from patents can be obtained.

"Obtaining Information From Patents" gives the Patent Office classifications and search services, and "Answers to Questions Frequently Asked About Patents" contain answers to 40 questions most frequently raised by inventors and businessmen.

Copies of these two pamphlets can be obtained from the nearest Field Office, U. S. Department of Commerce, or from the Office of Information Services, Patent Office, U. S. Department of Commerce, Washington 25, D. C.

♦

GRUNWALD PURCHASES KANIGEN PROCESS LICENSE

Grunwald Plating, Inc., Chicago, has purchased the processing license covering a seven-state area from the Kanigen Division of General American Transportation Company, East Chicago, Ind. Plant, equipment, and electroless nickel plating facilities are included in the sale.

In announcing the acquisition, Raymond R. Grunwald, president of the 27-year-old metal finishing firm, said that General American Transportation Company will continue to apply Kanigen processing to tank cars at the organization's Sharon, Pa. plant, but that all other custom plating operations will be removed to the Grunwald premises at 2559 W. 21st St., Chicago.

♦

POWERTRON ULTRASONICS HAS NEW SUBSIDIARY

Powertron Ultrasonics Corporation, with plant facilities at Westbury and Garden City, L. I., and Huntsville, Ala., has announced the opening of its new West Coast subsidiary, Powertron Pacific Corporation, in Los Angeles, Calif. The new facility is located at 3277 Wilshire Boulevard.

♦

HERDLEIN PRESIDENT OF NEW FIRM

Principals of a new firm, Wallace Herdlein & Associates Inc., with headquarters at 208 S. LaSalle, Chicago, are all former executives of The R. C. Mahon Co. of Detroit.

The new organization they direct is specializing in designing, engineering and manufacturing of metal cleaning, paint finishing and air handling systems, plant layouts for such systems, ovens of all types including low-temperature units for metal heat treating.

Wallace Herdlein, president of the new firm, was executive vice president of Mahon in Detroit. Other officers of the new firm are: L. H. McCain, vice president; R. K. Baker, vice president and treasurer; and Oscar Stiska, secretary.

♦

BATTELLE PUBLISHES BROCHURE ON CONTRACT

"The Administrative Controls of Contract Research for Industry"—a descriptive statement prepared by Battelle Memorial Institute—is now being offered to representatives of industry concerned with research and development. The statement is one of a series on the procedures and characteristics of contract research for industry which is being published by the Columbus, Ohio, research center.

The statement describes the balance of administrative controls between the sponsor of a project and the research institute engaged, under contract, to conduct the study. As pointed out in the statement, the sponsor retains basic control over the objective, scope, costs, and timing of research but is relieved of technological administration. Each of these aspects of administrative control is discussed briefly.

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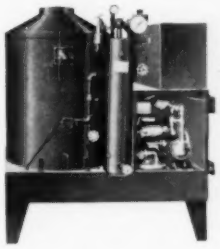

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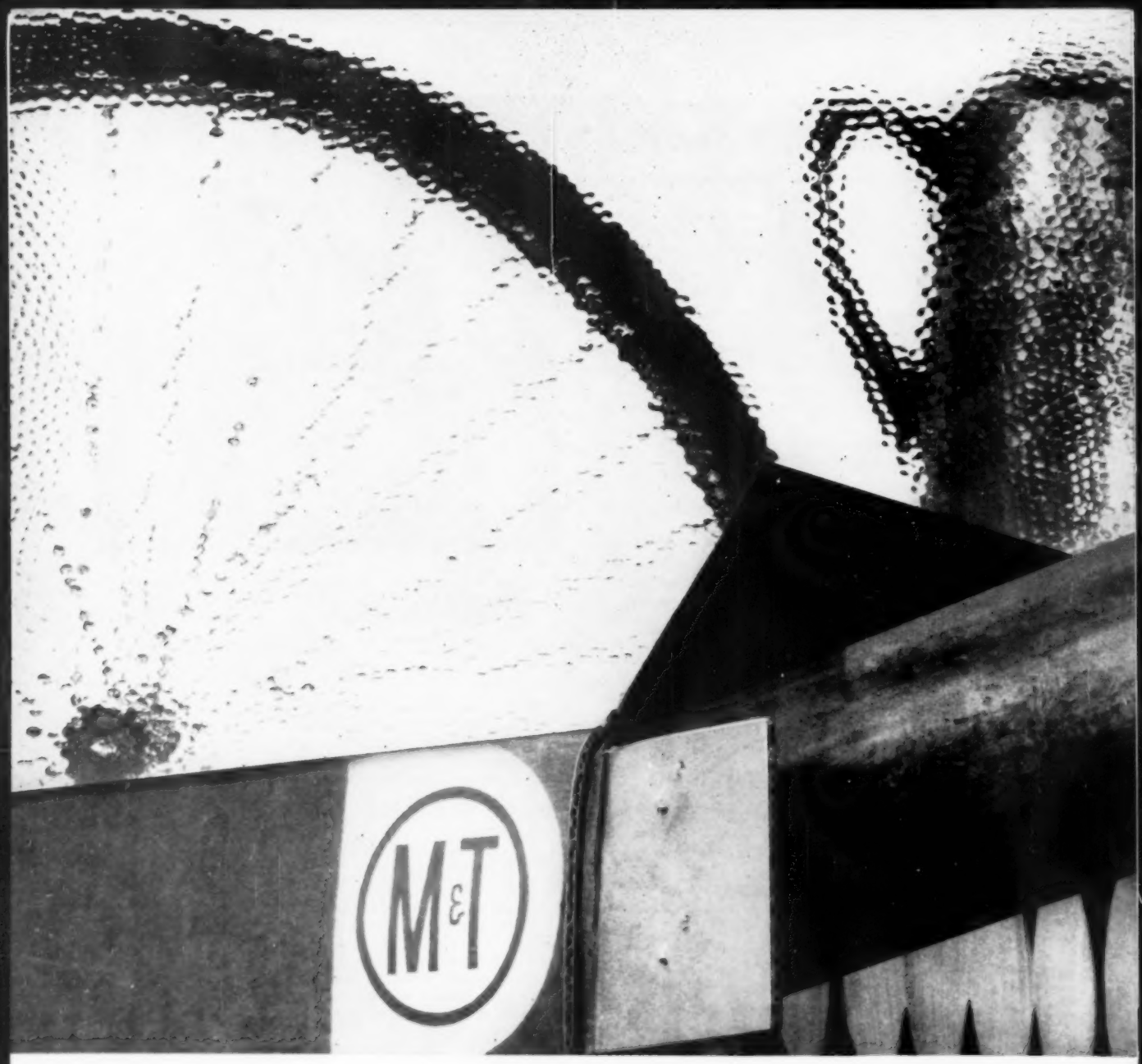

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PATENT ABSTRACTS

DR. D. GARDNER FOULKE
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Nutley, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

2,970,950, 2/7/61—ELECTROGALVANIZING INNER SURFACES—H. Bahmann, assignor to Benteler Corp., Philadelphia, Pa.

Claim 1 reads: "Method of electroplating in continuous operation the inner surface of tubes having impermeable walls and internal diameters down to 3 mm, comprising the steps of passing cathode-connected tubes continuously one after another through bath tanks filled with treatment liquids and at the same time feeding them along an axially arranged stationary anode which they surround, supplying uninterrupted current to the anode during the movement of the tubes through the plant in longitudinal direction, automatically sucking the treatment liquids of the individual bath tanks into the interior of the tubes, pressing it therethrough and, as soon as the rear end of a tube is free, pumping the liquid back into the respective bath tank."

17 claims and figure.

♦

2,971,826, 2/14/61—CHEMICAL POLISHING—C. Cohn, and S. Cohn, assignors to Colonial Alloys Co., Philadelphia, Pa.

After polishing aluminum articles for the desired time in a phosphoric-nitric acid brightening bath, immerse in a nitric acid bath to stop further brightening action.

2 claims, figure.

♦

2,971,862, 2/14/61—VAPOR DEPOSITION—C. Baer, *et al.*, assignors to National Research Corp., Cambridge, Mass.

A method of vapor plating heat sensitive substances with aluminum is described.

14 claims, figure.

♦

2,971,865, 2/14/61—IMPREGNATION OF POROUS METALLIC BODIES—A. Metcalfe and H. Nudelman, assignors to U.S.A. (Army).

Decrease the porosity of metal articles by subjecting the article to superatmospheric pressure then remove from the superpressure. Finally, heat to initiate the iron oxide-Al reaction.

1 claim.

♦

2,971,898, 2/14/61—PLATING POWDER METAL BODIES—P. Széky, *et al.*, assignors to Általános Géptervezö Iroda Budapest, Hungary.

To plate powdered metal (ferrous) compacts, treat with superheated steam, then plate over the blue oxide layer.

2 claims.

♦

2,971,899, 2/14/61—PLATING ALUMINUM ON Ni AND Co ALLOYS—D. Hanenk and A. Shoudy, assignors to General Motors Corp., Detroit, Mich.

Plating aluminum from a fused salt bath is described.

3 claims, figure.

2,972,403, 2/21/61—CONVEYOR—J. Barton, assignor to Frederic B. Stevens, Inc., Detroit, Mich.

A work-handling machine with skip mechanism is described.

10 claims, figure.

♦

2,972,555, 2/21/61—GAS PLATING ALUMINA—F. Deutscher, assignor to Union Carbide Corp., New York, N. Y.

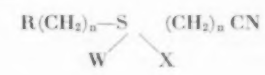
To plate alumina on a ceramic object heat said object to about 1000C, and bring into contact with aluminum tri-isopropylate in nitrogen at 450F.

2 claims.

♦

2,972,571, 2/21/61—NICKEL PLATING—J. Towle, assignor to the Harshaw Chemical Co., Cleveland, Ohio.

The use of 0.05 to 20 g/l of a sulfonate, etc. and 0.0025 to 0.075 g/l of a compound



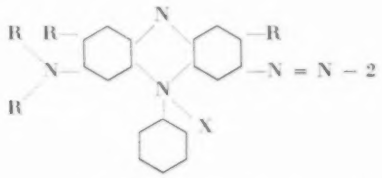
where R may be H or CN
and W may be a hydrocarbon radial
X may be sulfate, sulfonate, halide and perchlorate

7 claims.

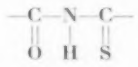
♦

2,972,572, 2/21/61—ACID COPPER PLATING—R. Cope, R. Harrover and Myron Ceressa, assignors to Westinghouse Electric Corp., East Pitts., Pa.

Claim 6 reads: "An aqueous electrolyte comprising from 20 to 40 oz/gal of copper sulfate, from 1.3 to 13 oz/gal of sulfuric acid, and an addition agent comprising an intimate admixture of (1) from 0.0001 to 0.005 oz/gal of a compound having the structure

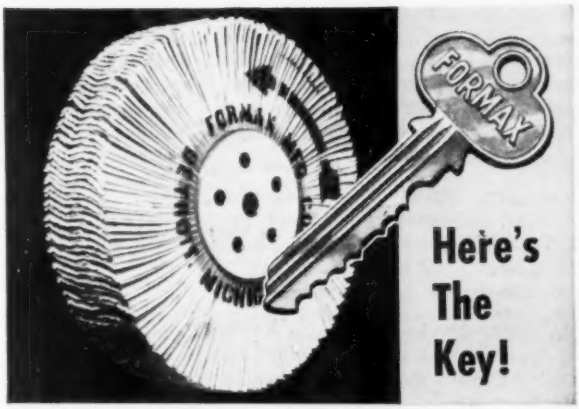


wherein R is a radical selected from the group consisting of hydrogen, methyl, and ethyl radicals, X is an anion selected from the group consisting of chloride, bromide, iodide, fluoride, sulfate, bisulfate, and nitrate, and Z is an aromatic radical selected from the group consisting of phenyl and naphthyl radicals substituted with amino, alkyl substituted amino, hydroxy, and alkoxy substituent groups and (2) from 0.0001 to 0.05 oz/gal of the product obtained by admixing and heating substantially equimolor quantities of at least one compound having the nucleus



with at least one compound selected from the group consisting of (A) monocyclic unsubstituted aromatic compounds containing in the ring structure from 4 to 6 carbon atoms and from 1 to 2 nitrogen atoms per molecule and (B) compounds having the formula

wherein R is a radical selected from the group consisting of hydrogen; monovalent and divalent saturated aliphatic hydrocarbon radicals having from 1 to 4 carbon atoms and in which the substituents are selected from the group consisting of $-NH_2$ and —OH radicals; monovalent and divalent alicyclic radicals containing from 5 to 6 carbon atoms in the ring in which the sub-



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stituents are selected from the group consisting of $-CH_3$, $-NH_2$ and —OH radicals; monovalent and divalent heterocyclic radicals having from 5 to 6 carbon atoms in the ring and in which heteroatoms occur only in the ring structure and the substituents occur only on the carbon atoms and are selected from the group consisting of $-NH_2$ and —OH radicals; phenyl radicals; and aminophenyl radicals.

2,973,253, 2/28/61—ETCHING SEMICONDUCTORS—R. Stead, assignor to Texas Instruments, Dallas, Texas.

The use of nitric and hydrofluoric acid and disodium phosphate is claimed.

9 claims.

2,973,283, 2/25/61—SURFACE TREATMENT—J. Hill, assignor to Engelhard Industries, Newark, N. J.

Coat Pt—Rh alloys with Pt, then Au followed by heat treatment.

5 claims.

2,973,304, 2/25/61—TREATING STAINLESS STEEL—E. Halin, assignor to Lyon, Inc., Detroit, Mich.

Anodic clean the stainless steel, withdraw for ½ to 2½ minutes, rinse, dip in dilute H_2SO_4, rinse, then bright chromium plate.

2,973,308, 2/28/61—PLATING ELECTROLYTE—K. Schimkus, assignor to Acme Steel Corp., Chicago, Ill.

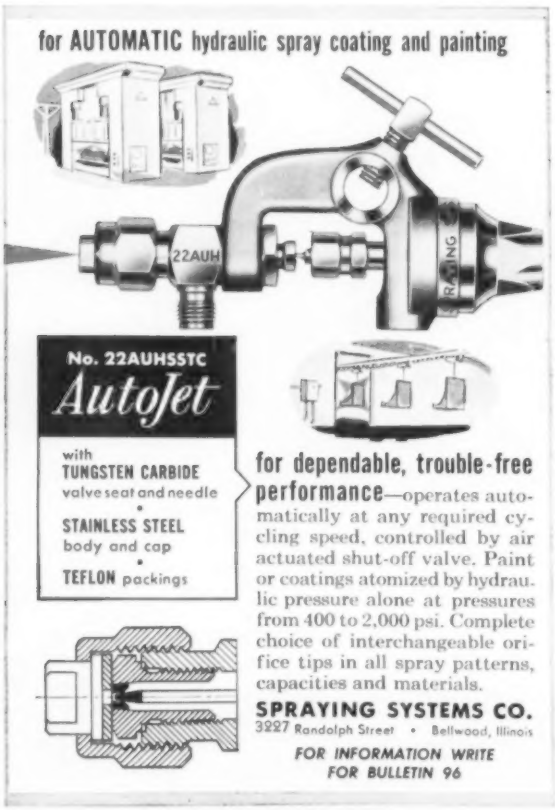
An electrolytic bath for coating with Zn, Cu, Ni, Sn, Co, Cd, Wo, Mn, Pb and alloys thereof containing said cations and the phosphoric ester of cyclohexanol as a complexing agent.

54 claims.

2,973,311, 2/28/61—POLISHING APPARATUS—A. T. Brunson and H. Davis, assignor to Rocky Metal Products Co., Denver, Colo.

An electrolytic polishing apparatus is described.

4 claims.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2,973,569, 3/7/61—SEMICONDUCTOR ASSEMBLY—I. Feinberg and A. Avakian, assignors to Sylvania Electric Products, Inc., Delaware.

Step in the assembly of a semiconductor device include soldering the element to a support, gold plating the assembly, removal of the gold from one surface of the element, then etching the surface.

4 claims.

2,973,571, 3/7/61—CONDUCTOR—J. Meyering, assignor to N. American Philips, Inc., New York, N. Y.

A current conductor consisting of a center of Fe, Cr, Ni, Cr, Ti, Zr followed by a gold, then a silver, then a gold layer is claimed.

2 claims.

2,975,039, 3/14/61—ETCHING ALUMINUM—R. Elliott, assignor to Pennsalt Chemicals Corp., Philadelphia, Pa.

A method for etching aluminum and alloys thereof is described as treating the surface in an aqueous solution containing 1 to 20 per cent of an etching alkali containing Mo^{6+}, Ni^{2+}, Fe^{2+}, or Fe^{3+} in the amount of at least 0.2 per cent of the weight of the alkali:

See also 2,975,040 assigned by the same inventor to Pennsalt claiming the presence of Co^{++}, in 5 claims.

4 claims.

2,975,041, 3/15/61—ETCHING ALUMINUM—E. Holman, assignor to Purex Corp., Ltd., California.

Claim 1 states: "A method of etching aluminum comprising, contacting aluminum with a solution containing free alkali metal hydroxide at a relatively high temperature to react the aluminum with said alkali metal hydroxide and form alkali metal aluminate in a first zone without producing any substantial amount of solid hydrated alumina therein, removing the resultant solution to a second zone, cooling said removed solution in said second zone in the presence of solid hydrated alumina to precipitate an additional quantity of solid hydrated alumina therefrom and increase the quantity of free alkali metal hydroxide therein, separating the precipitated hydrated alumina from the solution, and returning the solution to the first zone."

6 claims.

2,975,072, 3/14/61—PROTECTIVE COATING—E. Bryant and C. Rieff, assignors to Ferro Corp., Cleveland, Ohio.

A protective coating for engine exhaust systems consists of an electroless nickel deposit followed by an unfused porcelain enamel coat, with a final heat treatment.

5 claims, figure.

2,975,073, 3/15/61—CORROSION RESISTANT NICKEL PLATE—H. De Long and D. Ritzema, assignors to The Dow Chemical Co., Midland, Mich.

Claim 1 reads: "The method of increasing the corrosion resistance of nickel plate chemically deposited from an aqueous solution containing nickel and hypophosphite ions at a *p*H of between 3.5 and 7 on a magnesium-base alloy article immersed therein which comprises thereafter immersing the thus nickel-plated metal magnesium-base alloy article in an aqueous solution having a *p*H between 0.5 and 5 and containing a chromium compound selected from the class consisting of chromic acid and sodium dichromate, said chromic acid being employed in an amount between 0.1 and 5 per cent and said sodium dichromate between 5 and 15 per cent by weight of the bath."

2 claims.

2,975,081, 3/14/61—COLORING ALUMINUM—B. Kirby, *et al.*, assignors to Koppers Co., Delaware.

Claim 1 reads: "Method of coloring oxide-coated aluminum comprising applying a coloring solution of at least 0.01 per cent by weight of an organic water-insoluble colorant dissolved in a liquid substantially water-immiscible aromatic solvent having a

boiling point of at least about 80C, to aluminum having an artificially produced oxide coating thereon at a temperature between ambient temperature and the boiling point of said solvent."

6 claims.

2,975,112, 3/14/61—PLATING ZINC—E. Saubestre, assignor to Sylvania Electric Products, Inc., Delaware.

To extract zinc from germanium-bearing solutions, plate out the zinc at a *p*H of 3.0 to 3.5.

4 claims.

2,975,120, 3/14/61—ELECTROPLATING APPARATUS—H. Kenmore and W. Manson, assignors to National-Standard Co., Niles, Mich.

A wire plating apparatus is claimed.

1 claim, figure.

2,975,506, 3/21/61—FINISHING APPARATUS—G. Bell, assignor to Northwestern Steel & Wire Co., Sterling, Ill.

A drum apparatus for conditioning raw wire stock is described.

4 claims, figure.

2,975,513, 3/21/61—METHOD OF LINING—J. Chyle, assignor to A. O. Smith Corp., Milwaukee, Wis.

A liner sheet of stainless steel, nickel, nickel alloys, copper and copper alloys is laid down on a carbon steel base plate which has been cobalt or nickel plated. The base plate and liner are then spot-welded in many spots and finally the whole is welded.

2,975,882, 3/21/61—CONVEYOR—H. Abbey, Jamaica 23, N. Y.

A conveyor system is described.

8 claims, figure.

2,975,883, 3/14/61—PHOSPHATING—John Henricks, Logansport, Ind.

A phosphating bath is described as made up of a powder containing 20–40 parts of zinc nitrate having a ZnO coating, 2–20 parts of acid particles (diglycolic or sulfamic) starch coated, 30–50 parts of Na H_2PO_4 and 10–30 parts of Calcium chloride (Ca_3 $(PO_4)_2$ coated).

2 claims.

2,976,166, 3/21/61—COATINGS CONTAINING METAL OXIDES—R. White, Havertown, Pa. and W. Marceau, Upper Darby, Pa.

A method for forming a metal oxide coating on an article comprises forming and maintaining a flame from a combustible mixture, consisting essentially of oxygen and a combustible metal.

7 claims, figure.

YOUR PLATING MAGAZINE QUESTIONNAIRE

So as to assure that PLATING MAGAZINE's classification of its subscribers by number, function and geographical location is constantly and consistently up to date for Audit Bureau of Circulations audit, a Return Sheet was recently issued to each subscriber internationally. It is revealing that nearly 50 per cent of such Return Sheets issued were executed and returned by subscribers within ten days of issuance, with the flow, of course, continuing. If you have not yet accomplished and returned yours, your cooperation in doing so promptly will be appreciated by AES and PLATING.

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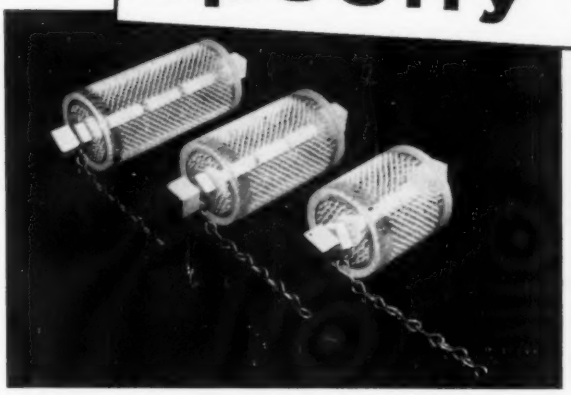

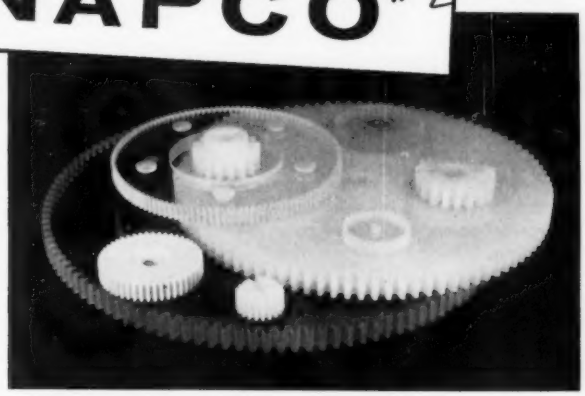

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EQUIPMENT AND SUPPLIES

E—801. ACID SALT—Nation-wide release of Wyandotte Pictax, newly developed dry acid product for plating lines, pickling and acid dipping is announced by Wyandotte Chemicals' J. B. Ford Division.

For use on steel, zinc die castings, copper and brass, Pictax is said to remove stains, rust and scale, provide high activation of metal surfaces, improve adhesion and brilliance of plate. It removes rust, scale and smut from steel, chromium plate from rejects, and activates nickel before chromium plating. It can also be used for preparing zinc die castings, brass and copper for plating.

According to the manufacturer, Pictax features resistance both to organic and inorganic contamination, eliminates changing the acid dip in the middle of the week, or even on a weekly basis.

E—802. BARREL FINISHING UNITS—New, improved versions of the Baird Machine Company "Electratilt" and "Hydratilt" barrel finishing units have been announced.

The two machines are essentially identical, possessing the same basic specifications and work capacities. The "Hydratilt" model incorporates a manual hydraulic device for raising and lowering the barrel while the "Electratilt," as the name implies, is provided with power tilting.

Both units require minimum floor space and are claimed to feature a high degree of safety and convenience for the operator. The number of moving parts and controls has been reduced and adjustments required simplified.

E—803. SILICON RECTIFIER—A silicon rectifier, with a unique, one piece, solid, copper-finned heat sink assembly has been developed by The Udylite Corporation.

Udylite's Ultrasil is said to be a totally new concept in design, construction and performance. The heat sink assembly gives peak cooling efficiency in less space and with better accessibility. Fused ceramic-to-metal diode insulation is hermetically sealed for extra reliability, ruggedness and long life.

Front, side and rear panels are easily removed for maintenance, and hinged front and rear doors provide a quick means for equipment inspection. Ultrasil units have capacities from 500 to 8000 amperes, 6 to 24 volts.

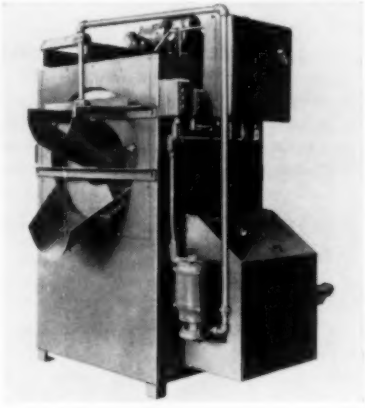
E—804. HAND CLEANER—A "new" Little Doc Disolvit, the original creme type waterless hand cleaner announced by Schaffner Manufacturing Company, Inc., is now fortified with lanolin and hexachlorophene so that hands will not be abused when Disolvit is used. Its hand cleaning efficiency is claimed to be greater than ever, and its odor is pleasant, due to new ingredients in its formula.

E—805. BELT LUBRICANT—American Buff Co. announces the distribution of an improved belt lubricant claimed to increase belt life from 20 to 120 per cent.

The improved lubricant, No. 371 polishing lubricant, is 100 per cent saponifiable. It keeps belt open and free-cutting at all times. The lubricant will go through both alkaline cleaners and vapor degreasers, and does not contain fillers.

E—806. SMALL PARTS BATCH WASHER—The Alvey-Ferguson Co. announces its new, one man operated small parts batch washer. Small parts can be high-pressure-spray washed in bulk in this small, compact, rotary drum, batch type machine, it is claimed.

Parts are introduced into this new machine through the upper chute. A drum with helical spiral tumbles parts gently, exposing all surfaces thoroughly to the high-pressure, fan-shaped spray inside the drum. The drum, perforated to permit draining of the solution, oil, chips and impurities, retains only the cleaned parts. On completion of the cleaning cycle, the drum counter-revolves for a rinse cycle for a pre-determined time, then the automatic timer shuts off rinse and rotates parts for another pre-determined cycle, then automatically discharges the clean, dry parts into a container by way of the lower chute.



E—807. SELECTIVE PLATING PROCESS—A new selective plating process has been announced by Selectrons, Ltd. Through the use of a special power pack, plating styluses, and non-toxic, generally basic electrolytes, all made in the United States, the process permits the deposit of many metals and alloys on almost any conductive basis material. Thicknesses are said to be precisely controllable, and are easily limited only to those areas where the plate metal is actually needed.

Several sizes of power supplies are available for use at a-c voltages generally found in industrial plants. D-c output is variable, to suit the engineering needs of the particular application. Selectron styluses are being manufactured in a number of sizes and shapes, for easiest handling of flat, concave, and convex surfaces.

ANNOUNCING...

American Electroplaters' Society's readable and understandable illustrated booklet, an AES mighty mite, titled:

INTRODUCTION TO ELECTROPLATING

by

EZRA A. BLOUNT
Editor, PRODUCTS FINISHING MAGAZINE

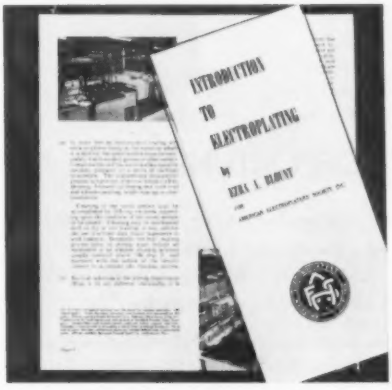
Now available either 1) for single copy purchase by individuals desiring a "McGuffey's Reader" type of authoritative indoctrination in Electroplating and Metal Finishing . . . or 2) for bulk copy purchase by companies or individual enterprises of the industry wishing such an elementary medium for the quick, reliable orientation of their apprentices, beginners or line personnel or for other educational or institutional purpose.

CONTENTS

I. What is Metal Finishing?
II. What is Electroplating?
III. Processing of Parts in the Plating Plant
IV. Plating Equipment
V. Good Workmanship
VI. Safety
VII. Need for Self Improvement

20 pages. Text illustrated by 17 instructive photographs

It was inspired by a stalwart of the Public Relations Committee of American Electroplaters' Society, Inc. (AES)—was initiated and endorsed by AES's Publications Committee—authored by one of the industry's best qualified authorities—approved by the Society's Executive Board—designed and created by AES's National Headquarters' publishing staff.



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E—808. REMOVABLE TRANSDUCERS—Development of the first removable ceramic transducers for use in any ultrasonic application, is announced by International Ultrasonics, Inc.

A patent pending configuration is the heart of the new development. The flexibility of the design is said to permit the transducers to be bolted through the middle to horns, cleaning tanks or any ultrasonic device, and are just as readily removed.

Additional features of the development are its electrical connections which need not be soldered on and therefore cannot break off, the ease of removing the transducers from an assembly for maintenance, replacement or frequency changes, and their flexibility for use in cleaning.

E—809. PORTABLE pH METER—New Electron II line-operated portable *p*H meter features a ±500 millivolt scale and a unique, full-range shock-resistant combination electrode, according to the manufacturer, Sel-Rex Instruments Division, The Meaker Company.

The new meter reportedly has the same high stability, and gives the same precise, reproducible readings (with standardization once-a-week or less), as the Electron I. Standard features include: constant-reading meter; amplifier-stabilized, drift-free indicator needle; reference pointer; easily connected solid ground; fast-response tubes which require no "breaking-in" time.

E—810. ANODE BAG—The M. E. Baker Company has announced new Polypropelene Anode Bags for use in both acid and alkali solutions and may be used in service up to 280F.

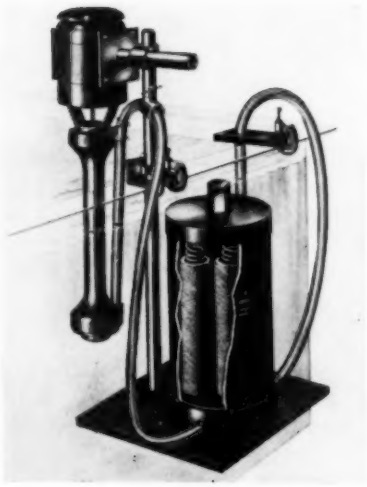
Polypropelene has low moisture absorption and because of its waxy nature, it is claimed the fibre will not retain any sludge, dirt or even dyes. The bags can be washed and reused in the same bath or in different baths over and over again.

Wet or dry these bags are said to have unusual strength.

E—811. METAL PURIFIER CONCENTRATE—Conversion Chemical Corporation announces the introduction of a new product, Kenvert Metal Purifier Concentrate.

The product finds special application in cadmium plating solutions to prevent burning in high current density areas. It ties up the usual heavy metal contaminates, with the exception of copper, according to the manufacturer. Use of this product is said to reduce the amount of brightener required. Improvement is claimed to have been achieved with as little as 4 fluid ounces per one hundred gallons.

The product acts as a scavenger in zinc baths and helps to intensify the action of proprietary brighteners. With the use of this product savings are said to be possible with either zinc or cadmium plating.



E—812. IN-TANK FILTER SYSTEM—To provide greater strength to the popular in-tank filter systems, the manufacturer, Sethco Mfg. Corp. announces that the epoxy in-tank pump is now available in a newly designed one-piece casting for the UAL and UAA series. Increased versatility is also made possible by the use of polypropylene in the construction of the detachable filter chambers and pumps for the first time as well as by the use of larger pumps and motors up to 1 hp.

It is claimed that chromic acid can be filtered up to 200F using these polypropylene filter chambers and pumps with titanium shafts. Epoxy chambers and pumps are used for filtering other solutions up to 250F easily and economically.

E—813. POLISHING & GRINDING MACHINE—The Uni-Pol polisher-grinder is now available for lapping and polishing of semi-conductor materials.

The machine incorporates an 80–1200 rpm variable speed control with a powerful semiconductor safeTcircuit ½ hp dc motor providing a constant torque at all loads. Vibration and rollout are said to be virtually eliminated. Compact low silhouette reduces operator fatigue. The pan, lap, polishing wheel and cover can be changed as one unit in seconds without danger of contamination.

E—814. DUAL SPINDLE LATHE—A new, dual spindle economy lathe which handles polishing, buffing, deburring and brushing jobs in half the normal time is now available from Murray-Way Corporation.

This lathe, the Model L12, is claimed to cut fixture costs in half, since only one Murray-Way Han-D-Matic or other semi-automatic part-positioning machine is required to do the job formerly requiring two machines. Time-consuming transfers to a second fixture are eliminated, and less floor space is required.

PLATING MAGAZINE

OPPORTUNITY TO AUTHORS

Member or non-member authors of technical and scientific papers on electroplating, metal finishing and allied arts are cordially invited to submit manuscripts of original, unpublished papers to the Editor of PLATING MAGAZINE for review and publishing consideration.

Any such paper accepted and published in PLATING will also be eligible for selection by the Society's Paper Awards Committee for the Carl E. Heussner AES Gold Medal Award; AES Silver Medal; AES Bronze Medal; George B. Hogaboom Memorial Nickel Plating Award; Robert S. Leather Mechanical Finishing Award; Chromium Plating Award; Precious Metal Plating Award of AES; John J. Hanney Memorial Copper Plating Award; Organic Finishing Award; Zinc Plating Award and the Aluminum Finishing Award of AES.

So as to expedite review and other processing, please write the Editor, PLATING MAGAZINE, 443–445 Broad Street, Newark 2, New Jersey, for full particulars, including a copy of "Publishing Specifications for PLATING MAGAZINE Authors", before submitting your manuscript.

TRADE LITERATURE

L—801. DEOXIDIZER—A new dry acid salt which deoxidizes aluminum alloys for phosphating, anodizing, painting, plating or bright dipping in one safe, fast operation is fully described in Technical Data Sheet No. 117, a three-page usage and instruction sheet prepared by MacDermid Incorporated.

Called Metex M-662, the product is claimed to be nitric-free, chromic-free and fluoride-free. Disposal of the waste solution is greatly simplified, and reduction is either eliminated or cut down. The product is said to produce an active surface for anodizing and an excellent base for any other final treatment of aluminum alloys.

Costly and dangerous carboy handling is eliminated because M-662 is in dry powder form instantly soluble in water. The product replaces liquid nitric acid and costs far less than 20 per cent nitric.

L—802. ABRASIVE MEDIA—Problems in the selection of the right abrasive media and compounds for use in vibratory and barrel finishing, are discussed in a new 3 color catalog bulletin issued by the Roto-Finish Company.

The bulletin illustrates a wide variety of media types for mechanical finishing operations such as grinding, deburring, descaling, polishing, britehoning and burnishing.

L—803. FILTRATION—Filtration, dust collecting, air conditioning, air pollution control, sieving, sifting, or straining are subjects of a new Reference Manual-Bibliography which has just been published.

This reference Manual was prepared with the cooperation of editors of technical and trade publications. As far as is known, it is the only comprehensive work of its kind ever published in these fields. It lists the subjects of many articles, publications in which they appeared, dates of issue, page numbers, and synopses of the contents. Copies may be obtained without cost from Snow Filtration Company.

L—804. SPRAY CLEANER—Diversey No. 519, a spray cleaner for ferrous and non-ferrous alloys, is described in a new bulletin available from The Diversey Corporation.

The company reports that No. 519 is designed for quick soil penetration, complete emulsification and dispersion, and free rinsing and draining. It is said to prevent scale on spray nozzles and is non-corrosive and readily soluble.

Also described is Diversey's new Diverfos F-72. According to Diversey, Diverfos F-72 combines effective cleaning action with spray phosphatizing for one-operation cleaning and phosphatizing.

L—805. ELECTRO CLEANER—Magnus 24-Y, a new electrocleaning chemical designed for both anodic (reverse current) and cathodic (direct current) cleaning of steel, iron, stainless steel and copper prior to electroplating, has been introduced by Magnus Chemical Company.

The new cleaner, according to the manufacturer, provides fast, effective cleaning through its high electrical conductivity.

It is used in a mixture of eight to 12 oz/gal of water at temperatures ranging from 190 to 200F for either anodic or cathodic cleaning. Depending upon the current output of the electrical system, 40 to 100 amp/sq ft are used.

L—806. METAL FINISHING GUIDE—The Lea Manufacturing Company has issued a new edition condensed metal finishing guide. This 4-page guide contains condensed information on materials and compounds for such finishing operations as buffing, burring, polishing and satin finishing. There is also a section on additives and specialties for bright plating processes for gold, silver, copper, nickel, cadmium, brass and zinc plating.

L—807. ADDITION AGENT—Frederick Gumm Chemical Company, Inc., announces the availability of an addition agent for acid solutions. Clepo Pickle Aid E-2 is said to completely suspend any oil globules present in acid solutions, thereby preventing them from re-depositing on parts prior to plating operations. In addition, it is claimed to provide a uniform foam blanket on the top of pickling solutions and eliminates the presence of obnoxious acid fumes. It can be used in pre-plating acid dips and will not interfere with subsequent plating operations. Additional information is available in Technical Bulletin 461.

L—808. WETTING AGENTS—A line of wetting agents for diversified industrial uses is described in a new booklet ISP-45 published by Nopco Chemical Company.

The brochure suggests dozens of applications for wetting agents in the field of metal processing, protective coatings, etc. The publication also contains accurate Draves wetting times of the various Nopco wetting agents listed, with additional data on chemical and physical properties and general recommendations for use.

More than a half-dozen uses in metal processing are suggested, including alkaline cleaners, acid cleaning, pickling, electrotype cleaning, rinse baths, electroplating, and soldering and welding fluxes.

L—809. CLEANING PRODUCTS—Sectionalized 6-page folder, F-2810 "Wyandotte Products for Electroplating," discusses electrocleaning, spray cleaning, soak cleaning, buffing compound removal, and removal of rust from precision parts. Emphasis is placed in fitting cleaning product to job. Featured Wyandotte electrocleaners include Maxamp for steel, Lectrite Z for zinc die castings, Lectrite NF for brass, B.N. for all-purpose electrocleaning.

L—810. AXIAL-FLOW FANS—Axial-flow fans for heating, cooling, ventilating, fume removal, and drying systems, are described in a new 16-page illustrated bulletin AFF-61 available from L. J. Wing Mfg. Co. Fans with direct-connected motors and designs with V-belt drive are covered.

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PERSONALS

HAROLD G. SPOTTS has joined Wyandotte Chemicals' industrial sales-service force, Los Angeles District.

His eight years' experience includes engineering service on metal finishing equipment and materials, and application of alloys used in the casting industry. Plating and foundry operations are also counted in his industrial work. He is a member of the American Foundrymen's Society.

H. G. Spotts

C. W. Ostrander

CHARLES W. OSTRANDER has been appointed to the post of technical assistant to the president at Allied Research Products, Inc., Baltimore.

Mr. Ostrander has been associated with Allied since its inception in 1941, and his most recent position prior to his promotion was technical director. In his new capacity, Mr. Ostrander has been given the special assignment of investigating the sales and technical problems associated with a new line of metal finishing products being developed by Allied Research.

He will also continue to be primarily responsible for patent work, foreign liaison, and technical liaison between the Sales Department and the Product Development Group.

Mr. Ostrander is well known in many technical societies, including the American Electroplaters' Society, and is the author of a number of papers delivered before various AES and other groups.

♦

HAROLD J. O'BRIEN of Cranford, N. J. has joined the staff of The Hubbard-Hall Chemical Company, Waterbury, Connecticut as a metal finishing technical representative. He will serve accounts throughout New Jersey with Hubbard-Hall's complete line.

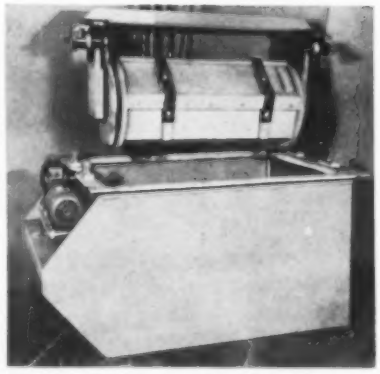
Mr. O'Brien comes to Hubbard-Hall from the Udylite Corporation where he was a New Jersey sales representative for ten years. Before that he had been in charge of plating and quality control at the Brunswick Corp. of New York. Mr. O'Brien belongs to several professional societies including the Newark Branch of the AES.

H. J. O'Brien

R. L. Winston

ROBERT L. WINSTON has been appointed chief engineer of Varland Metal

PLASTIC PLATING BARREL



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Service. A 1943 chemical engineering graduate of the University of Cincinnati, he was formerly employed as chief methods engineer at the Electric Autolite Company's Sharonville bumper division. He is a member of the American Electroplaters' Society and is presently a vice president of the Cincinnati Branch.

♦

DR. MAURICE J. KELLEY has received appointment as director of research laboratories of The Diversey Corporation.

Before joining Diversey, Dr. Kelley had served as director of the project coordination department and director of industrial specialists laboratories of Nopco Chemical Co., Harrison, N. J. He joined Nopco in 1936 as research chemist in the synthetic organic laboratory.

Dr. Kelley earned the degree of PhD in organic chemistry in 1942 at the University of Pennsylvania. He also holds an MS degree in organic chemistry from Fordham University and an AB in chemistry from LaSalle College. Since 1939 he has done additional graduate work at the Graduate School of Business Administration, New York University.

Dr. Kelley is a fellow of the American Institute of Chemists, former chairman of the New York Chapter of AIC, and a member of the American Chemical Society, American Association for the Advancement of Science, The Chemical Society (London), and several other professional organizations. In 1959 he received the Honor Scroll of the New York Chapter of the American Institute of Chemists.

Dr. M. J. Kelley

B. Durham

C. J. Novotny

E. H. King Jr.

BRUCE DURHAM has been appointed a regional sales manager of Industrial Filter & Pump Mfg. Co.

Supervision of sales activities in 14 northeastern states will be Mr. Durham's new responsibility. Prior to this new assignment, he represented the company as a service engineer and performed technical services within the research and development section.

CHARLES J. NOVOTNY and **EDWARD H. KING JR.** are new sales engineers for Industrial Filter. The former received his BS degree in chemical engineering from Illinois Institute of Technology in 1960, having made the school's dean's honor list and attending on a scholarship. Mr. Novotny spent his collegiate summers in research and development at the filter firm, and upon graduation was employed in its water and waste treatment division.

Edward King has been employed by Industrial Filter for over three years in cost engineering and as a corrosive linings salesman. He is a Morton Junior College graduate and is presently working toward a BS degree.

♦

ARNOLD L. WILCOX has been named to the position of sales representative for G. S. Blakeslee & Company's line of vapor degreasers, metal parts washing machines and degreasing solvents.

Before joining Blakeslee, Mr. Wilcox was associated with Graver Water Conditioning Co., where he was in charge of sales engineering for the state of Michigan. A chemical engineering graduate from South Dakota School of Mines and Technology, he will headquarter in Detroit.

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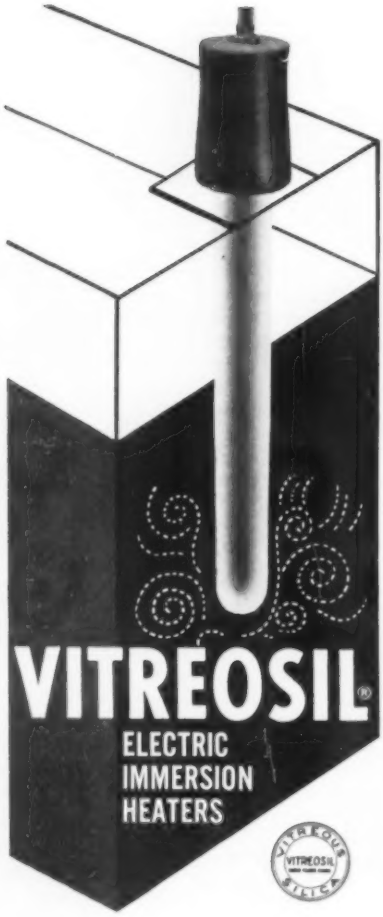

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INDICATE A 837.

DAVID B. ORDEN has been named manager of Latin American operations for the International Division of Metal & Thermit Corporation. Mr. Orden will be responsible for M&T's over-all development in the Latin American area. His headquarters will be in the company's executive offices at 100 Park Avenue, New York City.

Mr. Orden joined M&T in 1956, when he was appointed M&T's special representative for Latin America. In 1959 he was made a director of M&T's Mexican subsidiary, Industrias M&T de Mexico S. A., a company in Monterrey, manufacturing zirconium silicate used in the opacifying field.

Prior to joining Metal & Thermit, Mr. Orden held posts in metallurgical and chemical industries in Europe and South America. He is a graduate of the Niels Brock School of Business Administration of Copenhagen, Denmark and the Institut Superieur de Commerce of Neuchatel, Switzerland.

D. B. Orden

R. Voltmann

ROBERT VOLTMANN has been appointed product development manager by MacDermid Incorporated. He has been assigned to the company's research laboratory in the Waterbury, Connecticut plant.

Before joining MacDermid, Mr. Voltmann was employed for 12 years by Chrysler Corporation as a laboratory supervisor and a project engineer.

Mr. Voltmann is the author of numerous technical reports on metal finishing subjects. He has also disclosed ten ideas to the Patent Office, ranging from a new type high-voltage thickness tester to a new immersion nickel process.

A former resident of Pontiac, Michigan and graduate of Wayne State University, he is a member of the American Electroplaters' Society.

♦

ARTHUR J. TOMSON and **TIMOTHY P. FLYNN** have joined the staff of Metal & Thermit Corporation's Electroplating Division Detroit research facilities.

Mr. Tomson comes to M&T after ten years at the Detroit Institute of Cancer Research, where he worked in organic synthesis. He received his education at Wayne University, where he was also employed for a year and a half as a microanalyst. A member of the American Chemical Society, he has published more than a dozen papers on organic synthesis and chemotherapy. He joins M&T as a research chemist and will be engaged in research on electroplating additives.

Mr. Flynn holds a BS degree from St. Norbert College, DePere, Wis. and an MS degree in inorganic chemistry from the University of Detroit. At M&T, his first professional affiliation, he will be engaged in fused-salt electrolysis and electroorganic research with the company's pioneering research group. Mr. Flynn is also a member of the American Chemical Society.

♦

R. L. CAWLEY has been appointed a district manager in The Diversey Corporation's Southern Pacific Division.

Mr. Cawley will supervise Diversey sales and sales promotion in all of Arizona and extreme southern California. He joined the company as a sales representative in 1951.

♦

JAMES D. JARVIS has been named to the newly created position of director of sales personnel recruitment for The Diversey Corporation.

Before joining Diversey Mr. Jarvis had been with the Alex Proudfoot Company, Chicago. He is a graduate of Bowling Green State University, Bowling Green, Ohio.

♦

JOSEPH C. LOWEY has been named manager of the Metal Industries Division of The Diversey Corporation. He will be responsible for developing markets and expanding sales of Diversey's chemical cleaners and surface preparation compounds.

Before joining Diversey, Mr. Lowey was director of marketing for Clayton Mark & Co., Evanston, Ill.

♦

CALVIN E. SNELGROVE has joined the metal finishing engineering staff of the E. S. Browning Co., San Francisco as chemist and sales engineer. He brings 22 years of metal finishing and chemical background to Browning.

Prior to his present appointment, Mr. Snelgrove held various chemist positions in analytical, research and development, plating consultant, and technical sales management work with well-known firms in the West Coast metal finishing industry.

♦

ROGER FENWICK, former Cleveland representative of Allied Research Products, Inc., Baltimore, has been moved to the Boston territory. Mr. Fenwick will reside in the Boston area, but will work in close contact with Allied's new service laboratory at 625 Bostwick Avenue, Bridgeport, Conn.

At the same time, Allied has announced the appointment of **ROBERT B. GLEISNER** as sales representative in Cleveland,

with headquarters in the Bulkley Building, 1501 Euclid Avenue. Prior to joining Allied, Mr. Gleisner was for 11 years a sales representative for the Magnus Chemical Company.

♦

LEONARD B. SAX, president of American Buff Co., was selected by the American Management Association to be chairman of a one week seminar discussing "The Chief Executive's Job in the Smaller Company".

The seminar, attended by presidents of corporations with annual sales volumes averaging six to seven million dollars, was held June 12–16 at Saranac Lake, N. Y.

♦

RAYMOND C. KENDALL has been appointed sales manager of National Ultrasonic Corp., Nutley, N. J. In his new position, Mr. Kendall will be responsible for the national sales and distribution of ultrasonic cleaning equipment.

Mr. Kendall received his BS degree in mechanical engineering from the University of Connecticut. Before joining National Ultrasonic, Mr. Kendall was field engineer of ultrasonics for Gulton Industries, Inc., Metuchen, N. J.

♦

OSCAR A. STOCKER has been named district manager for the New England States for Sel-Rex Corporation, Nutley, N. J. Mr. Stocker, in addition to promoting Sel-Rex precious metal plating processes, will represent the complete electroplating and metal finishing equipment, chemicals, and services offered by Sel-Rex's subsidiary, The Meaker Co.

A graduate chemical engineer of the University of Michigan, Mr. Stocker has held technical and executive positions in the electroplating industry for over 35 years. Before joining Sel-Rex, Mr. Stocker was sales and service engineer with the United Chromium division of Metal and Thermit Corp. for five years. He was chief chemist for Bohn Aluminum & Brass Co. for eight years, and was associated with Seymour Manufacturing Co. for over 16 years.

♦

HOWARD E. EVERSON has been promoted to director of research, Diamond Alkali Company. Mr. Everson will succeed Thornton F. Holder, who died last month.

Assistant director of research since 1958, Mr. Everson joined Diamond in 1951 as a senior chemist in research. Subsequently, he was responsible for other research assignments until 1956, when he was transferred to the central engineering department in Cleveland as a senior engineer.

Prior to joining Diamond, he served three years on the faculty of the University of Cincinnati as an assistant professor of chemistry. He was also employed by a prominent chemical producer in inorganic research.

P. H. LONG has been named a district manager in The Diversey Corporation's Southern Division.

Mr. Long will supervise Diversey sales and sales promotion in Virginia, North Carolina, eastern Tennessee and part of Kentucky. He joined the company as a sales representative in 1951.

♦

FRANCIS J. CLANCY has been appointed an assistant secretary of DuBois Chemicals, Inc.

Mr. Clancy joined DuBois in 1959 and is presently serving as manager of the company's Los Angeles plant, a position he will continue to hold. He is a native of New York City and was graduated from City College of New York with a degree in business administration.

♦

JAMES L. BAUDREAU has been promoted to take charge of Shipley Company Inc.'s West Coast technical sales. He was previously a sales representative and helped to establish Shipley's West Coast headquarters in Los Angeles last February.

Mr. Baudreau was with MIT Lincoln Laboratory in Massachusetts as a research assistant in encapsulation of electronic components. He was also with the Dewey and Almy Chemical Company before joining the Shipley firm.

♦

JAMES F. ADAMS JR. is transferred to the New York Office technical service department, Solvay Process Division, Allied Chemical Corporation, as assistant to the director of sales. **ALEXANDER H. MacDONELL** succeeds Mr. Adams as manager of technical service in the Syracuse, N. Y. office.

Mr. Adams joined Solvay Process in 1939 as a chemical engineer in the company's research department. He served in the Navy in World War II and in the Korean War as a lieutenant commander. Appointed manager of the product section of Solvay's technical service department in 1952, Mr. Adams became manager of the department in 1956.

He received his chemical engineering degree from Syracuse University, is a licensed professional engineer in New York State and a member of the American Institute of Chemical Engineers.

Mr. MacDonell received his chemistry degree from Columbia University following study at the University of Georgia. He joined Solvay's technical service department in 1951. Transferring to the sales department, he was subsequently assigned to Solvay's Detroit and New York sales branches. Mr. MacDonell returned to the technical service organization in 1960 and was appointed assistant manager—technical service, in February 1961.

OPPORTUNITY TO AUTHORS INTERESTED IN MILWAUKEE CONVENTION PARTICIPATION

Emphasis being placed in programming the AES's Annual Convention to occur in Milwaukee, Wisconsin, June 24–28, 1962 is upon creating an educational program so significant and appealing, that few persons seriously interested in educational enrichment in electroplating, metal finishing, organic coating and other such subjects can afford to miss it.

Member or non-member authors or original, unpublished technical and scientific papers on electroplating, metal finishing, organic coating and allied arts wishing to be considered as prospective participants in that Milwaukee educational program are cordially invited to communicate either with Host Branch Educational Chairman Joseph Andrus direct (Address: 62-01 Howard Street, Chicago 48, Illinois) or through the Editor of PLATING MAGAZINE, 443–445 Broad Street, Newark 2, New Jersey.

Particularly desired for consideration are proposed original technical papers on the subjects of mechanical finishing, organic coating, pickling and etching of aluminum for finishing purposes, etc.

The Editorial Board will consider the preliminary program at its meeting in September 1961. You are consequently urged to record your availability with Mr. Andrus forthwith. State your subject (and send a preliminary abstract if possible) but please do not submit any manuscript until after the full particulars as to specifications have been sent to you.

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15 — Holland 5 H.P. — 10 H.P.
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BOOKS

Remittance must accompany all book orders placed with AES Headquarters.

1960 Supplement to the Metal Cleaning Bibliographical Abstracts—STP 90-E 36 pp., Paper Cover, Non-members $2.00; AES Members $1.85.

This Supplement to the Metal Cleaning Bibliography Abstracts covers the period 1958 through early 1960. There are 114 references for this period as well as 100 newly added references for the period prior to 1958.

New metals present new cleaning problems which must be solved by advanced technics or combinations of older methods. Ultrasonic cleaning, in-place cleaning of equipment in plants, or of pipe lines, and the cleaning of electronic components are receiving much consideration for the special problems involved. The reader will find not only references of practical application, but also on theory and laboratory evaluation.

Rare Metals Handbook, second edition, C. A. Hampel, editor, xvi + 715 pp. Nonmembers $20; AES Members $16.50.

This is a big book—bigger by about half than the first edition published seven years ago: there are 715 7x10 two-column pages against 657 6x9 single-column, and 35 chapters compared with 29. In it more than 40 contributors offer up-to-date information on the occurrence, extraction, economics, physical and chemical properties and applications of 55 metals which the title tells us are "rare." Such a compendium raises almost insuperable problems for a reviewer, who cannot be expected to match in himself the knowledge and experience of many authors, each an expert in his individual field. Faced with the task of saying something intelligent and helpful about the book, the reviewer (this one, anyway) can only sample those chapters the subjects of which lie within his experience, and communicate some general impressions about the book as a whole. These impressions emerge as an inextricable mixture of favorable and not-so-favorable ones.

Let it be said at once that there is an enormous amount of information in this book. The chapters on the individual metals for the most part follow a uniform and logical arrangement; a typical outline is: historical introduction, occurrence and sources, production and price statistics, extractive metallurgy, metal recovery; physical properties, mechanical properties, chemical properties, corrosion resistance, toxicology, alloy systems, and applications; bibliography. By the liberal use of tables, it has been possible to cram much data into relatively little space, so that the better chapters would be an excellent place to begin a study of their subjects.

Unfortunately it is necessary to say "the better chapters," for the quality of the contributions in this book varies widely. Tantalum is thoroughly covered in a fifty-page chapter citing 103 references; the equally important manganese in twelve pages with 19 references. Titanium gets 21 pages with only 13 references cited, while plutonium (which may be a good deal more glamorous but certainly cannot be of concern to as many readers) occupies 57 pages and the bibliography runs to 224 citations. Since the writing in most chapters appears to be fairly concise, the amount of information conveyed can be taken to be roughly proportional to the length of the chapter; surely the proportions indicated, and many others which could be cited, are evidence of a lack of balance which will disturb some readers.

One of the most valuable features of any book of this type should be the bibliographies: any reader seriously interested in one of these metals surely wants to be guided to further sources of information. The 158 citations on columbium and 181 on uranium are representative of good performance in this respect, even though the latter are padded by what E. B. White called "a garland of ibids." But 13 on titanium, 13 on cesium and rubidium (of which almost half are references to ephemera such as trade journals) are examples of the opposite. The method of citing references in the cobalt chapter is most confusing; and the molybdenum article merely lists references without any indication of what portion of the text they refer to. It must be admitted that getting 40 contributors to meet publishing deadlines is a heroic job in itself, and it is not surprising that some of their contributions are not up to standard.

To the electroplater, strictly in his capacity as electroplater, this book has little to offer. The words "electroplating" and "plating" are not indexed at all; nor are "protection" and "finishing." "Electrodeposition" is indexed for bismuth, cadmium, cobalt, gallium, germanium, indium, manganese, palladium, platinum, plutonium, rhenium, rhodium, thallium, titanium and zirconium; it will be obvious that for many of these the deposition has to do with production rather than plating. Where, as in the case of cadmium and chromium, the plating process itself is discussed, the discussion is usually brief and of little value; an exception is the rather good section on plating indium. It is regrettable that in discussing cadmium plating the authors give further currency to the statement that "cadmium coatings have greater resistance to atmospheric and galvanic corrosion than do similar zinc coatings." While this is true as regards salt spray tests and marine conditions, it is not true for all atmospheres and should be so qualified. As a minor point, the con-

tinued use of the term "base metal" to designate the substrate in electrodeposition is unfortunate; careful writers will say "basis metal."

In treating the "rare" metals the fact that little space is given to their electrodeposition is not intended as a derogatory criticism. What is disappointing, however, is the lack of any information about plating *on* some of these metals. The protection, by electroplating or other means, of many of the newer "space-age" metals is a serious problem, not to be shrugged off by the statement, for example in the molybdenum chapter, that "details of coating and testing procedures and of test results are given in various references at the end of this article." Nor is the index helpful in this regard.

Many will cavil at the title "Rare Metals Handbook" for a volume which includes, for example, manganese, cadmium and chromium but omits mercury, silver and gold. Nevertheless, as the editor points out in his introduction, there is a certain logic in the contents as well as the name, and this reviewer winces only at the thought of cadmium as a "rare" metal; perhaps that is because he is a plater. And as for the title itself, one is tempted to criticize it until one tries to think of a better one.

To sum up, here is an excellent compendium of basic knowledge, flawed by certain inadequacies the importance of which will depend on the reader. The publisher has done his usual fine job of production—I noted no typographical errors, though undoubtedly there must be some, and the binding, printing and paper are of the best. In fact the paper may be too good: the publisher may have confused the English and the German meanings of "heft" for the book represents a potential accident hazard if dropped. Possibly a future edition should be printed on somewhat lighter-weight stock; this might also help to keep the rather high price from taking off into the blue altogether.

Dr. F. A. Lowenheim
Metal & Thermit Corp.
Rahway, New Jersey

Metals Handbook, 8th edition, Vol. 1—Properties and Selection of Metals. 8¼ by 10⅞ inches. 1300 pp. 1300 contributors. 6700 illustrations. 1841 tables. Over 1500 examples. 2806 definitions. American Society for Metals, Novelty, Ohio. $30.00

The new ASM Metals Handbook contains more useful and reliable information on corrosion than any previous edition of this reference. Twelve major articles now deal with the corrosion of specific metals and alloys. Covering 133 pages, these articles alone contain 272 illustrations and 134 tables. Their value is further enhanced by other leading articles on mechanical properties and fabricability of corrosion-resistant metals. The entire volume is devoted to the selection and properties of metals and is the first of a projected series which ultimately will cover all branches of metals engineering and metalworking. A total of 1300 metals specialists are named as contributors.

A 24-page article on "Selection of Mild Steel for Corrosion Service" provides a comprehensive treatment of a subject of major interest. Equally helpful are the articles dealing with the selection of stainless steels for atmospheric and marine corrosion service and for corrosion service in chemical processing equipment. Still other articles evaluate the corrosion characteristics of aluminum, copper and copper alloys, lead, magnesium alloys, nickel and nickel alloys, zinc, and precious metals. Several more specialized articles deal with such subjects as the selection of tin coatings for steel containers.

Compared to the subjects on properties and selection in the previous edition, the new Metals Handbook offers nearly six times as much numerical information (as distinguished from descriptive text) in the form of charts, graphs, and tables. This increased emphasis on easily accessible data and a closer relation to engineering practice (as evidenced by the large number of specific examples and comparisons) constitute the major differences between the 7th and 8th editions of this standard reference. A 64-page index makes information searching easier and less time-consuming.

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BRANCH NEWS

Total AES Branches U. S., Canada, Australia, August 1, 1961—60.

BLUE RIDGE

Corrosion Testing Lab Visited

On June 3, members and guests of the Blue Ridge Branch visited the Kure Beach-Harbor Island Testing Stations of the International Nickel Company near Wrightsville Beach, North Carolina. Several members and guests from North Carolina and Virginia made the trip to the east coast of the state for this tour. Several of the members brought their families for a weekend of fishing, beach combing, sightseeing and relaxation.

Those taking the tour met at the Harbor Island Laboratory at 9:00 a.m. After introductions to **Dr. T. P. May, C. H. Sample** and **Vic Taylor,** our hosts for the day, the group was briefed on the work being done at the Harbor Island Laboratory and the Kure Beach atmospheric test site. The group was then divided and our hosts conducted a tour through the laboratory. On the tour the various methods for testing the corrosion resistance and rate of corrosion of various metals, metal alloys and non-metals were pointed out. This phase of the tour ended about 11:30 a.m.

The group then drove to Carolina Beach where they lunched as guests of International Nickel. After lunch the tour of the Kure Beach site was held. Mr. Sample and Vic Taylor very informatively pointed out and discussed the electroplated panels being tested. The tour was not hurried and our hosts very thoroughly answered the many questions asked them. The resistance to corrosion of various thickness of nickel, duplex nickels, chromium thicknesses and duplex chrome systems was observed.

After completing the tour at 4:00 p.m. the members expressed their thanks for a very interesting and informative tour and an enjoyable day.

Donald H. McGee
Secretary

BOSTON

Cadmium and Zinc Plating Discussed by Jackson

Boston Branch met Thursday May 4, 1961, at the Hotel Statler under President **Foley.** The roll call of officers showed missing Secretary **George P. Swift,** reported ill; and **Manson Glover** was designated Sec Pro Tem. The minutes of the meeting of April 6 were read and accepted. It was voted that the Branch Delegates to the Annual Meeting be not instructed. Three men were elected to membership.

Librarian **Bob Pierce** announced that the next meeting would be held at Carling's Brewery, on Route 9 in Natick, and that wives and girl friends would be welcome.

Bob then introduced **Joseph L. Jackson** of the **R. O. Hull** organization to speak on Bright Cadmium and Zinc Plating. Assuming a basic familiarity on the part of the audience and answering questions as he went along, Joe made definite individual points rather than a formal talk. He likes metallics in brighteners provided rate of depletion is known and balance is kept against organics, and the metallics have a wide tolerance. He emphasized plating art against science, stating that the latter is often used mostly to explain what happens. He pointed out that cadmium costs several times zinc, zinc simulates chromium better and looks better than cheap chromium, but cadmium is important for solderability. With interesting examples, he showed that low cadmium serves for throwing power, high for efficiency; that attempts to control metal by adding CN and caustic merely dissolve anodes faster, a problem for which there is no simple answer. Of impurities, organic are common in cadmium as from overdose of brighteners or accidental grease and oil, with metallic impurities accidental. Cadmium in zinc, often from mixed-up anodes, can sometimes be precipitated by a heavy dose of sulfur, tin can be removed with H_2O_2, chromium reduced with hyposulphite.

Cadmium requires precaution against poisoning. It beats zinc in marine corrosion, loses in industrial. Shape and basis material of work may influence choice: cadmium is easier to plate on many metals, has better throwing power than zinc and better coverage.

For throwing power and coverage Bob recommends high caustic content, on the ground that CN^- molecules are bulky and actually obstructive, whereas sodium complexes (zincates) are smaller and penetrate more freely. Ratio between the two makes a real difference in bath behavior.

The discussion was reluctantly concluded after ten o'clock.

Manson Glover
Secretary Pro Tem

CINCINNATI

Marzano Is Speaker; Picnic on Aug. 19

The May 24 meeting was called to order by **Earl Leonhardt** who turned the meeting over to President Elect **Gerard Poll Jr.** The group gave a standing vote of thanks to Past President Leonhardt for a job well done.

Two applications for membership were approved. **Dick Evans** reported that plans had been finalized for the Annual Picnic which will be held on Saturday, August 19, and will include a lunch at 1:00 p.m. and buffet dinner in the evening. The annual ball game between the Platers and Suppliers will highlight the afternoon festivities.

The speaker for the evening was **Christopher Marzano** of the Amphenol-Borg Co., who discussed the Plating of Difficult Metals. Mr. Marzano explained the processing of metals such as tantalum, beryllium, magnesium, aluminum, special bronzes, etc. Aided by slides, he pointed out the details in the cleaning, activation and plating of the difficult metals. Variation of minor alloying elements can materially modify the process necessary to produce a plated part which will meet the stringent requirements of the space age.

Blue Ridge Branch members examining exposed plated panels at Kure Beach. Left to right, Don McGee, Carzelle Looper, Bill Huffman, T. P. Jolliffe, Del Taylor, C. M. Butler, Herb Norris, Mike Milo, Joe Cherry, Howard Welfare, Clarence H. Sample, George Lefevre, Mike Stogner, Frank Holliday and Dr. Nelson Murphy.

BRANCH SECRETARIES

Branch News is required of all Secretaries monthly by AES Bylaws. First of the month is Branch News deadline for next PLATING issue. Any items on hand on that date will be carried in that edition. Later arrivals will appear in the issue immediately following. In reporting talks given by speakers before the Branch, please give titles of the talks, the speakers' full identification and any other pertinent information of interest to other Branches and PLATING's broad readership.

Milwaukee Branch Honorary Members Night. (Left) L to r, Arthur Linn, new Branch President; Dexter Rhodes, Branch Past President; John Foley, Honorary Member; Eugene Piellusch, Immediate Past President. (Center) Dinner at Pabst Blue Ribbon Hall. (Right) Eugene Piellusch receiving Branch Past Presidents Pin from Arthur Linn. Seated, Dexter Rhodes and John Foley.

After a question and answer period, the group adjourned to the social hour sponsored by MacDermid Inc., **Gil Osterfeld,** host.

David L. Kaplan
Secretary

MILWAUKEE

Honorary Members' Night

The Milwaukee Branch honored **John C. Foley** with an Honorary Member presentation at the June 7 meeting at the Pabst Blue Ribbon Hall. The dinner meeting, always noted for its fine refreshments and entertainment, was attended by 129 members and guests including three of the Branch's Honorary Members, **Henry Bornitzke, Joseph Birbaum** and **Nick Servatius,** to whom the night was dedicated.

Ex-president **Dexter Rhodes** made the presentation to John Foley citing his good record of attendance at the Branch's various meetings. Despite the 200 mile trip he needed to make from Onalaska, Wisconsin, John Foley has been attending since his election to the Branch in 1929.

Dexter Rhodes presided over the installation of officers: **Arthur Linn,** president; **Clinton Host,** first vice president; **John Auchter,** 2nd vice president; **Leslie Diveley,** secretary-treasurer; **Curtis Hunsaker,** Branch educational chairman; and **Sy Taterzynski** and **Eugene Piellusch,** board of managers.

William Crawford, vice president of Chrome-Rite Company, Chicago, gave a short talk entitled, "What the Job Shop Has Meant to Our Industry." One point he emphasized was that the jobbers must specialize in their work and not try to be too diversified.

The evening was concluded with a color movie called "Mike," which showed the training required to develop a good retriever for duck hunting.

Clinton Host

MONTREAL

Loucks Talks on Aluminum

The regular monthly meeting was held at the Sheraton Mount Royal Hotel on May 15.

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The guest speaker for the evening was **J. Loucks** of the Aluminum Company of Canada. Mr. Loucks gave a very interesting talk on the Finishing of Aluminum. He supported his talk with illustrations and colored slides after which he answered questions from the floor.

Mr. Loucks was thanked on behalf of the Montreal Branch by **Mr. Lamarche.**

The Montreal Branch elected new officers for the forthcoming fiscal year. These are: President, **B. Millward;** 1st Vice President, **H. Wilson;** 2nd Vice President, **S. Frost;** 3rd Vice President, **J. Bourbonniere;** Treasurer, **C. D. Reisenburg.**

The Montreal Branch will be holding its annual Golf Tournament on June 9, 1961. A large attendance is expected.

G. A. Katronge
Secretary

NEWARK

Plating Class Graduated; Lind and Nadel Speakers

President **Al Korbelak** called the May meeting to order at 8:35 p.m. with 70 members and guests in attendance. **Art Carlson,** vice president of the New York Branch, honored us with his presence.

We received two membership applications and elected one man to membership.

Two invitations were received; one from the New York Branch, and the other from the Philadelphia Branch inviting us to their meetings this month.

Don Foulke announced the death of **Peter Travisano** and that a condolence card had been sent to the family.

Cy LaManna was called upon to present the awards to the men who completed the Electroplating Course. He was assisted by both Al Korbelak and Don Foulke. Cy LaManna thanked the people and the organizations which made the course possible.

Gene Wagner, the new Branch educational chairman, then presented **James Lind** who gave the Timely Topic. Jim explained in detail how Weston Instruments plated Alnico No. 5 alloy and an iron-lead alloy mainly for solderability. Cracks, pits and pores in these alloys were most troublesome, and he felt that the use of an alkaline deruster eliminated most of these troubles. The fact that these alloys could be soldered to withstand 2000–2400 psi to fracture the soldered parts indicates that it is a sound, reliable production process.

Milton Nadel then spoke on the "Hard Coating of Aluminum." He rapidly reviewed anodizing and stated that the Marten hard coating patent is now owned by Alcoa. This coating can be produced essentially in a 15 per cent sulfuric acid bath maintained at 32F and at 20–25 A/ft^2 beginning at 25 to 30 volts and increasing the voltage finally to 40 to 60 volts. When the coating reaches the thickness of 1.6 mils in thickness, it is at an equilibrium, i.e., the oxide film dissolves about as fast as it is formed. However, by maintaining a cool bath, films as thick as two mils have been made.

He stated that some people have anodized aluminum in oxalic acid baths using superimposed alternating current. Good firm contact and good agitation are necessary. "Burning" in the high current areas is a problem. However, two to three mils of coating have been obtained in 15 minutes by this process and in some instances 10 mil coatings were produced.

In closing, Milton Nadel stated that the U. S. Department of Agriculture, Office of Technical Services has published a manual on the "Study of Hard Coatings for Aluminum Alloys."

A lively question and answer period kept both speakers busy. Both were given a rising vote of thanks.

Gustav Bittrich
Assistant Secretary

NEWARK

New Sustaining Member; Panel Answers Plating Questions

First Vice President **John Kosmos** called the June 16 meeting to order with 40 members and guests present. **Art Carlson,** Vice President of the New York Branch, again visited us.

Ray Abazia reported that Ideal Plating and Polishing Co. of Newark had joined the Branch as a Sustaining Member.

No applications were received. However, six men were elected to membership.

The meeting was turned over to **Gene Wagner** for the main activity of the evening, namely a question-and-answer period. The panel of experts consisted of Messrs. **Di Chiara, Ehrhardt, La Manna, Lux** and Kosmos.

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Numerous questions were submitted, covering a wide variety of items. Attempts were made to answer all questions either directly or by reference to another source.

After the meeting adjourned, the members discussed their problems over beer, cheese and crackers. It was a very fruitful evening. Then many of us looked forward to the forthcoming convention in Boston and to a pleasant summer.

Gustav Bittrich
Assistant Secretary

NEW YORK
Rech Talks on Coatings

President **Jack Weiner** called the meeting to order at 8:30 p.m. with all officers present.

Motion made and carried that one application for membership follow regular course.

Following recommendations of board of managers four members were accepted and duly sworn by President Weiner.

The Board of Managers recommends $300 be alloted for expenses of three Delegates to convention at Boston. The board also informed the members that the Bylaws as corrected by committee headed by **Sol Ader** are being printed and will be mailed to all members of the N. Y. Branch.

Librarian **Walter Schwartz** introduced **Philip C. Rech** of the Pennsalt Chemical Co., who spoke on the "Hinac Process." This is a process for applying chromium containing coatings from an aqueous solution. There are three different coatings under this process, and they can be applied to all metals. Mr Rech covered the application methods for the coatings all of which can be applied by dipping and roller coating, with the exception of color which must be roller coated or sprayed. The coated pieces must be baked after application producing a very resistant finish on all metals.

Following the question and answer period, Mr. Rech received a round of applause from the members in appreciation for his introduction to these new ways of finishing metals.

Fred Saras
Recording Secretary

ROCHESTER
50th Anniversary/Regional Meeting Finalized

The May 1 meeting of the Rochester Branch was called to order at the Rochester German Club by President **John Cipolla.**

There was no speaker as the main part of the meeting was devoted to making final preparations for the Rochester Branch's 50th Anniversary meeting and Regional Conference which was held at the Hotel Manger on May 5 and 6.

It was decided that the Branch would hold its final meeting on June 5 at the Rochester Red Men's Club with a Smorgasbord dinner. Election of officers will take place at this meeting.

Peter VanDilst
Secretary

ROCHESTER
New Officers Elected; Schaeffer Given AES Cuff Links

The Rochester Branch held its last meeting of the season June 5th, at the Rochester Red Men's Club. The meeting was highlighted by an excellent smorgasbord dinner and the election of officers for the coming season. They are: President, **Charles Fideor;** first vice president, **Loring Carson;** second vice president, **Victor Bonaldi;** secretary and treasurer, **Peter VanDilst;** Branch educational chairman; **Samuel D'Angelo;** board of managers, **Fred Thiem, Frank**

ATOMIC LABORATORIES SITE OF MIDWEST REGIONAL COUNCIL THIRD ANNUAL TECHNICAL SESSION

Argonne National Laboratories, Lemont, Illinois will be the host for the Third Annual Technical and Workshop Session of the Midwest Regional Council on Saturday, October 28, 1961. A symposium, "Plating on Uncommon Basis Metals" will be the highlight of the meeting to be held in conjunction with the traditional workshops on metal finishing problems. A steak dinner and a guided tour of the atomic reactors at this government site will be included in the $9.00 registration fee. Registration blanks and programs will be mailed in the near future to all members of the AES whose Branches comprise the Midwest Regional Council, namely Chicago, Milwaukee, Mississippi Valley, Rockford, St. Joseph Valley and St. Louis.

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Beuckman, John Cipolla, **Anthony Cottrone, Vern Schaeffer** and **Robert Flint.**

Vern Schaeffer gave a report on the success of the Rochester Branch's 50th Anniversary and Empire State regional meeting extending personal thanks to all who helped make this affair a great success. After his report, President **John Cipolla** presented Vern with a set of AES cuff links and tie bar for the outstanding work he did as chairman of this fine meeting.

After the election of officers, President Cipolla gave his farewell address and turned the meeting over to the new President Charles Fideor. As new president, he immediately went to work appointing several committees for the coming season. Under his leadership, the Rochester Branch should have another very successful season.

Peter VanDilst
Secretary

SOUTHEASTERN
Cashen is President; Clem Hohner, Ladies Chairman; Next Regional Planned

The Southeastern Branch held its regular monthly meeting at the Pig-N-Whistle Restaurant on May 12, 1961, **Myron M. Randman** presiding.

The highlight of the evening was the installation of new officers: President, **Vince Cashen;** first vice president, **Jerry LaChappelle;** second vice president, **Roy Peterson;** Branch educational chairman, **John Varner;** secretary-treasurer, **H. R. Stogner Sr.**

Vince Cashen spoke briefly promising many innovations in Branch leadership and expressing a determination to work hard towards more interesting meetings and larger attendance.

Clem Hohner was appointed chairman of the Annual Ladies Night to be held sometime in August at the Druid Hills Country Club.

Vincent L. Cashen

Robert H. Probert, newly appointed Dixie Region General Chairman announced the selection and cooperative acceptance of the 1962 Dixie Region Committee: program, **Pat Millikin;** entertainment, Clem Hohner; plant tour, **Claude Nalley;** education, John Varner; secretary, H. R. Stogner; publicity, J. LaChappelle; registration, **Bob Rutledge, Carl Sweet;** ladies, **Mrs. H. R. Stogner Sr.**

At a later date a publicity chairman from each Branch will be appointed to assist Mr. LaChappelle.

Robert H. Probert
Assistant Secretary

SPRINGFIELD
Golf, Installation And Banquet

Tee-off, on this June 10—Saturday noon of the fifth Annual Golf Outing, Installation of Officers, and Banquet, was accompanied by a drenching downpour and sound effects with special lighting. By three, however, the sun came out and the duffers and others made the rounds. To add interest, there were many new water hazards.

The business portion of the program was opened at 8:50 p.m. by President **Alexander R. Salmond.** He announced that, due to illness, **Elery Gibson** could not make the outing.

President Salmond introduced **Rovi Rekhi** of Delhi, India, as special personal guest of **Asher Nesin** of Micro-Abrasives Corp. of Westfield.

President Salmond thanked all of the committees, officers, and everyone else who had helped make his tenure of office such an easy one, and then introduced **Edward R. Dupuis,** as the installing officer for the incoming group.

As each post was named, the individual was congratulated, and sworn in to his office; the final office to be filled was that of president of the Branch. In this, Ed said he had a double honor, as his son **Louis E. Dupuis** had just graduated from college, and now he was being installed and sworn in as the president of the Branch. Ed then presented outgoing President Al Salmond with a Past President Pin.

President Dupuis introduced **John E. Costigan,** as last year's recipient of the Order of the President's Pot, and he

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asked Jack if a suitable person had been selected for this year's winner. Jack said he had made a choice and presented the Pot to **George H. Mongeau,** the Branch treasurer.

President Dupuis introduced **Wayne Sanders,** as chairman of the activities committee, and turned the program over to him. The winner this year of the Colin Hastie Memorial Trophy went to **William J. Giblo** with a 75 low gross. Other scores and prizes were given out and the door gifts were distributed to the lucky winners.

The meeting was adjourned at 9:37 p.m., and a good time was had by all, in spite of the rain. There were 62 members and guests present.

Henry L. Heissfeld
Secretary

TORONTO
Bergin Talks on Liquid Compound; Successful Ladies' Night; Golf Tournament

The Toronto Branch held its monthly meeting May 12, 1961 in the Algonquin Room of the Royal York Hotel. Dinner attendance was 13 and the meeting attendance, 22.

Kergan Wells introduced the speaker, **Francis Bergin** of the Liquabrade Division, Lea Manufacturing Company, who excellently expounded with depth his subject, "Application of Liquid Compounds for Semi- and Automatic-Polishing Machines." After a question and answer period, the speaker was thanked on behalf of the Branch by **Alex Patterson.**

Brock Laws reported on the success of the Ladies' Night held at the King Edward Hotel, Saturday, May 6. The 200 or more members and friends enjoyed an evening of tasteful entertainment, dancing and prizes. Brock also alerted everyone for when the Golf Tournament.

Dinner draw prize was won by Alex Patterson and the door prize by **C. Chappelle.**

New members recommended by the executive were accepted and the meeting adjourned at 10:30 p.m.

H. B. Jones
Seeretary

WATERBURY
Dubpernell Speaker at Old Timers Night

The Waterbury Branch held its regular meeting at the Roger Smith Elton Hotel on May 11. This meeting was designated "Old Timers Night." Many of the retired members of the Branch returned for the occasion. The business portion of the meeting was featured by the election of next year's officers. They are: **Louis Porretti,** president; **Patrick Mazzamaro,** first vice president; **Francis Schneiders,** second vice president; **James Kennedy,** secretary-treasurer; **Clarence Foster,** Branch educational chairman; **Frank Tirendi, William Giesker,** Francis Schneiders, delegates; **Michael Orient, William Innes, Martin Sternfels,** alternate delegates.

It was reported that the 22nd New England Regional Meeting held in Hartford on April 22 was the biggest yet, with over 900 tickets sold and over 838 attending the dinner.

Dr. George Dubpernell was introduced by Technical Chairman Patrick Mazzamaro. Dr. Dubpernell is no stranger to Waterbury and it was very fitting that he should address the "Old Timers Night." The topic was "What's New in Metal Finishing" and it was demonstrated 78 times that a lot was new in the finishing field. Dr. Dubpernell brought a segment of his library to the meeting and reviewed many of the books for us. It was "shades of old times."

Refreshments were served after the meeting. There will be no meetings of the Waterbury Branch until September 14. Good-by.

F. A. Schneiders
Publicity

AES LAPEL BUTTONS

The AES member's handsome sterling silver lapel button can be purchased from your Branch Secretary at $1.38 per button including tax. These, in turn, can be purchased by Branch Secretaries from National Headquarters at that amount. The silver Branch Past President's button can be purchased by Branch Secretaries from the National Office at $1.43 per button including tax.

For cleaning these sterling silver buttons, here is one expert member's reported method, "Place hot water in which a little washing soda has been dissolved into an aluminum pan or any container with a small piece of aluminum at bottom (concentration: one tablespoonful of soda to one quart of water). Immerse the button so as to touch aluminum, and allow to soak until tarnish disappears. Operation will clean but will not injure the silver."

AES MEMBERSHIP REPORT

ELECTIONS

Buffalo: J. E. Gillen Jr.
Columbus: G. Miller, F. Schlader, C. W. Schriver, J. S. Vanos
Dallas-Ft. Worth: R. S. Young, J. D. Culp, P. F. Wisely, R. H. DiOrio, N. D. Allan, R. D. Robertson, B. R. McKinney, F. E. Lothridge, R. E. Hall, N. P. Ward, D. R. Hill, K. M. Waters, R. DeViney Jr., E. L. Wright, F. T. King Jr., G. A. Boles, K. Posey Jr., J. L. McIlveene, S. A. Furgerson
Hartford: R. I. Preuss
Miami: E. F. McNevin, A. R. Kiefer Jr., R. T. Parkey
Milwaukee: D. F. Domencich, D. A. Treptow
Montreal: J. Havelka, J. Henderson
Newark: A. S. Mustacchio, A. E. Sakavich, G. P. Robinson, E. C. K. Kraan, T. Geist, F. L. Durr
New Haven: A. A. Jaffee, F. M. Longo
New York: B. N. Francis, G. A. Miller, T. Babin, G. Gleit, A. Ciccotelli
Philadelphia: A. B. Middleton
Portland: N. N. Minamoto, M. V. Marsh, H. C. Sugg, E. P. Stierly, A. E. Pekman
Rochester: G. F. DeGrave, C. J. Bonaffline, E. R. VandeVelde
Seattle-Puget Sound: P. P. Raney
Southeastern: H. M. Lissemore
Toronto: R. G. Aishford, J. C. Price, E. Best, W. J. N. Throop, W. Demchuk

REINSTATEMENTS

Newark: E. Hackenburg
New York: D. Marmer
Member-at-Large: S. Wernick

TRANSFERS

Blue Ridge: L. C. Jackson from Los Angeles
Central Michigan: K. DeLiefde from Grand Rapids, E. J. Montie from Milwaukee
Chicago: H. E. Nice from Detroit
Cincinnati: G. M. Scanlon from Cleveland
Cleveland: G. Scanlon to Cincinnati
Columbus: J. W. Dini from Cleveland, W. Mazon from Toledo, N. Baker to Dayton
Detroit: A. R. Waters from Cincinnati, W. G. Millman to Waterbury
Hartford: W. E. Bridgett from New Haven
Los Angeles: L. C. Jackson to Blue Ridge
Memphis-MidSouth: F. Schnieder from Chicago
Newark: E. Malone from New York
New Haven: T. A. Mobile Sr. from New York
New York: N. N. Cahan from Syracuse, D. Marmer to Hartford, S. Fuhr to Newark
Philadelphia: F. Fulforth to Miami, J. R. Hildebrand to Lancaster
Rockford: T. O. McCullough from Milwaukee, G. P. Beardsley from Milwaukee
Southeastern: B. Brooks from New York
Toronto: H. Baka from Montreal

RESIGNATIONS

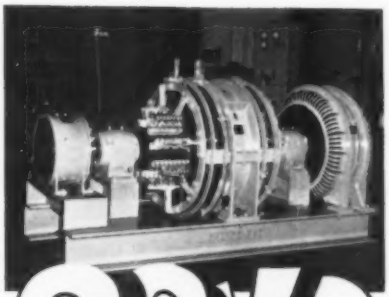
Buffalo: C. J. Manzemer
Detroit: R. W. Plank, R. R. Kenyon, R. Boccarossa
Hartford: P. E. Hamel
Melbourne: L. Janowska
Milwaukee: H. A. Winkler, J. Ashmead, R. L. Brown, W. J. Lawrie, J. E. Noerenberg, W. K. Rehberg
Newark: R. Brumberger
New York: N. Kameno
Philadelphia: R. A. Ameisen, J. J. Hagans, E. C. Lindsay, A. A. Schubert, F. M. Sullivan
Toronto: A. H. Beck, E. F. Hutt

SUSPENSIONS

Columbus: H. G. Ingle, S. E. Timmons
Melbourne: R. A. Woods
Montreal: N. Coisman, M. Gagne, A. W. Green, L. G. Johnson, F. G. Kelley, L. Lamarre, P. Larue, P. St. Pierre, F. Sylvain, A. Vagacs, M. A. Vogel, J. E. Zairos
Newark: D. Swann
New Haven: W. J. Bercier, C. E. Covey, A. P. Martino
Seattle-Puget Sound: H. Archibald, J. Werner

DEATHS

Buffalo: E. M. Dildine
Montreal: L. Sylvia



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ELECTROPLATING COURSES

BROOKLYN, N. Y.—Ft. Greene Evening High School
Louis Serota, Instructor
18-wk. course—Fee: None

CHICAGO, ILL.—Illinois Institute of Technology
J. M. Andrus, Instructor
18-wk. course—Fee: $80

CLEVELAND, OHIO—Max S. Hayes Trade School
H. Pochapsky Instructor
15-wk. course—Fee: $11

INDIANAPOLIS, IND.—Purdue University Extension
Dr. A. M. Max, Instructor
16-wk. course—Fee: $45

MONTREAL, QUE.—Polytechnique Institute
Dr. Andre Hone, Instructor
3-year course—Fee: $50

NEWARK, N. J.—Plants and Laboratories in Area
F. J. LaManna, Instructor
Climax-Grayway Co., 560 Winters Ave., Paramus, N. J.
14-wk. course—Fee: $25

NEW HAVEN, CONN.—New Haven College
L. J. Durney, Instructor
4-15 wk. Semesters—Fee: $50 per semester
Sept. 1961—Jan. 1962—Electroplating Practice
Feb.—June 1962—Electroplating Fundamentals
Students may enter at any point.

PHILADELPHIA, PA.—Temple University Technical Institute
Dr. S. Heiman, Instructor
4 Semesters, each 16 wks.—Fee: $37 per Sem.

PORTLAND, OREGON—Portland State College
Dr. J. R. Mickelsen, Instructor
10-wk. course —Fee: $10

PROVIDENCE, R. I.—Central Senior High School
Omer Jette, J. Fogarty, J.Castriotta Instructors
2-year course—Fee: None

ST. LOUIS, MO.—Hadley Technical H. S.
Dr. Otto C. Klein, Instructor
16-wk. course—Fee: $10

SAN ANTONIO, TEX.—Trinity University
W. P. Wisdom, Instructor
18-wk. course—Fee: $10

SAN FRANCISCO, CAL.—Cubberly H. S., Palo Alto
William Ferry, Instructor
24-wk. course—Fee: $3 per 12wk semester

SOUTH BEND, IND.
Dr. H. J. Wiesner, Instructor

SPRINGFIELD, MASS.—Chicopee Vocational H. S.
R. J. Girard and E. F. Koetsch Jr., Instructors
Two 12-wk. courses—Fee: None

TORONTO, ONT.—Central Technical High School
R. H. Clark, Instructor
22-wk. course—Fee: $15—non-res.
$ 5—city res.

VANCOUVER, B. C.—Vancouver Technical School
Walter Kellerman, Instructor
6-mo. course—Fee: $15

BLACKSBURG, VIRGINIA—Virginia Polytech Inst.
Professor Nelson F. Murphy, In Charge
Short course—Aug. 20 to Sept. 1, 1961—Fee $25

EVANSVILLE, IND.—Joseph B. Kushner Electroplating School
Joseph B. Kushner, Instructor, 621 S. Norman Ave.
4 mos. to 1 yr. correspondence courses—Fee: $150

SANTE FE SPRINGS, CAL.—Weiner Electroplating School
Milton Weiner, Instructor, 12631 Imperial Highway
3 courses, each 12 weeks—Fee: $40
Practical Electroplating & Metal Finishing, starts Sept. 18, 1961
Theoretical Chemistry & Electrochemistry, starts Jan. 8, 1962
Theoretical & Practical cost & calculations, starts Apr. 2, 1962

The above listings were correct so far as could be ascertained at press time. Prospective students are urged to verify courses and fees prior to making definite plans.

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BRANCH EDUCATION

GRADUATES OF NEWARK BRANCH 1961 ELECTROPLATING COURSE

Left to right, front row, R. P. Walsh, A. E. Sakavich, A. S. Mustacchio, C. H. Bowman, N. A. Ciccone, F. J. LaManna, chairman; F. J. Frey, J. C. Wismer, honor graduate and valedictorian; R. F. Heinrich, M. R. Vretenar, R. C. Holgate, W. A. Jordan, N. J. Rahaniotis, A. J. Seuffert. Back row, D. J. Mendola, V. Ribes, R. W. Fitzgerald, M. E. Bodner, W. G. Carreiro, F. T. Gallico, R. E. Via, H. Henderson, S. A. Sarrecchia, W. A. Monzo, G. M. Vingara. Not present, T. W. Brock, H. Hill, M. L. Klein, W. M. Ludders.

NEWARK BRANCH GRADUATES 29 PLATERS

by F. J. LA MANNA

Chairman, Newark Branch Electroplating Course

Graduation ceremonies at the Robert Treat Hotel in Newark, on May 19, for the Newark Branch Electroplating Course, saw 29 graduates recognized with framed diplomas for their successful completion of the 15-week course.

The 1961 Course was a result of close cooperation between the local plating industry, metal finishers and suppliers with the committee, in setting up the most diversified and interesting classes since the course's inception in 1955. It included instruction in the fundamentals of plating, chemistry, chemical calculations, cleaning, pickling, conversion coatings, barrel finishing, barrel plating, control and analysis of solutions, quality control, as well as detailed sessions in copper, nickel, chromium, tin and tin alloys, cadmium, zinc, electroless nickel and precious metals plating. The lectures were given on successive Tuesday evenings beginning February 7 and ending May 16, 1961, by expert instructors who lectured in their own specialized fields. For the most part, the classes were held at the various plants or laboratories of the instructors in the metropolitan Newark-New York area. All instructors and their facilities were generous voluntary contributors to plating education, for which the Newark Branch and the Electroplating Course Committee owe a sincere debt of gratitude.

For the 1961 course, the widely acclaimed "Newark Branch Electroplating Course Manual" was again revised, and three new chapters were added to the growing edition. The Manual is a compilation of lectures and other material in question-and-answer form, which has proved of great aid to the students and platers in general, in helping them to understand the various problems of the metal finishing world. The manual has also received attention from all parts of the world, and is now an accepted textbook in a large eastern university, and a reference source in parts of Europe, Australia and Japan.

Each student received a copy of the manual as part of his registration fee, as well as copies of the "1961 Metal Finishing Guidebook," various pamphlets, and technical and industrial literature throughout the course. Recommended textbooks, obtained by the students at cost, included Graham's "Electroplating Engineering Handbook," Rodger's "Handbook of Practical Electroplating," and Blum and Hogaboom's "Principles of Electroplating and Electroforming."

PLATING MAGAZINE invites AES Branches to furnish news for publication in PLATING concerning electroplating courses sponsored.

Because of the wide divergence of formal education among the students, there were no final examinations, but homework covering the essentials of the specific subject as well as problems in calculating current densities, amperage, areas, volumes, proportions, thicknesses, costs, chemical problems, etc., helped the student to grasp the fundamentals of solving everyday plant problems. These assignments were graded and returned to the students at the following class, where a homework review usually cleared up some vexing problems. One student emerged as valedictorian of the class with an unprecedented 100 per cent average. He was Joseph Wismer of the Apex Plating Co., Linden, N. J., whose impromptu valedictory speech before the graduation class, bespoke of the many hours of sincere effort put into solving admittedly tough and sometimes seemingly ambiguous problems. The homework was designed so that the manual, Guidebook and texts could be used as reference sources, and to make them an integral part of the student's library. The graduation diploma was predicated upon the homework and attendance averages of the students.

The attendance record for the 15 sessions was unusually high at 94 per cent, considering the exceptionally bad weather in the Newark area during February and March. This average indicated the high level of interest in promulgating plating education in the area. Also very popular was the practice of serving refreshments after the classes (generously provided by the participating companies), which implemented the lecture and plant tour by serving as an informal question-and-answer period.

In conjunction with the course, those students not already AES members received membership applications, as most students chose to complement their education by joining the Society as members of the Newark Branch.

On behalf of the Branch and the Electroplating Course Committee, the writer publicly acknowledges with sincere appreciation the cooperation and wholehearted efforts of all the participants in helping to make the 1961 Course the most informative and interesting yet offered.

1961 NEWARK BRANCH ELECTROPLATING COURSE

SUBJECT	LOCATION	INSTRUCTOR
Fundamentals of Plating	Sel-Rex Corp.	A. Korbelak
Fundamentals of Chemistry		Dr. D. Foulke
Barrel Finishing	Metal Finish, Inc.	P. Kirchartz
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Chemical Calculations I and II	Robert Treat Hotel	F. La Manna
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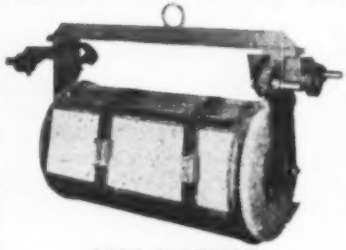

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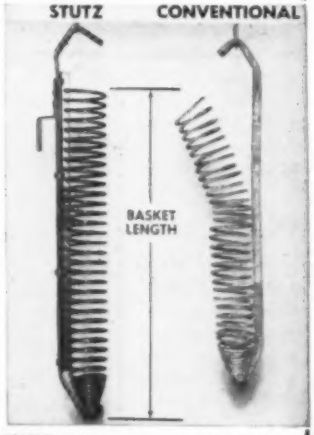

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September 16,	1961—**Executive Board Meeting,** Buffalo, N. Y.
Sept. 22-23,	1961—**Editorial Board Meeting,** National Headquarters, Newark, N. J.
September 22,	1961—**Third Metropolitan Regional Technical Session,** New York Host Branch, Statler-Hilton Hotel, New York, N. Y.
September 29,	1961—**Research Committee Meeting,** National Headquarters, Newark, N. J.
October 28,	1961—**Midwest Regional Council,** Third Annual Technical and Workshop Session, Argonne National Laboratories, Lemont, Illinois.
December 1,	1961—**Melbourne Branch Annual Dinner,** Melbourne, Australia
December 1-2,	1961—**Detroit Branch Annual Educational Meeting and Banquet,** Statler-Hilton Hotel, Detroit, Mich.
Dec. 15-16,	1961—**Newark Branch Annual Educational Session and Banquet,** Robert Treat Hotel, Newark, N. J.
January 12-14,	1962—**Executive Board Meeting,** Hotel Marott, Indianapolis, Indiana.
January 13,	1962—**Ninth Interim Meeting, Supreme Society,** Hotel Marott, Indianapolis, Ind.
January 20,	1962—**Grand Rapids Branch Annual Meeting,** Pantlind Hotel, Grand Rapids, Mich.
January 27,	1962—**Chicago Branch Annual Educational Meeting and Banquet,** Conrad Hilton Hotel, Chicago, Ill.
February 9-10,	1962—**Fourth Annual Dixie Regional Educational Meeting,** Dinkler-Plaza Hotel, Atlanta, Georgia
February 17,	1962—**New York Branch Annual Technical Session and Banquet,** Hotel Statler-Hilton, New York, N. Y.
March 2-3,	1962—**Philadelphia Branch Annual Educational Session and Banquet,** Benjamin Franklin Hotel, Philadelphia, Pa.
March 3,	1962—**Dayton Branch Annual Educational Session and Banquet,** Biltmore Hotel, Dayton, Ohio.
April 21,	1962—**23rd Annual New England Regional Meeting,** Hotel Statler, Hartford, Conn., Springfield Branch, Host.
May 1,	1962—**Central Michigan Branch,** Annual Educational Session and Banquet, Hotel Hayes, Jackson, Mich.

June 25-28,	**1962—49th AES Annual Convention,** Schroeder Hotel, Milwaukee, Wis. Sponsorship Midwest Regional Council.
June 24-27,	**1963—50th AES Annual Convention,** Ambassador Hotel, Atlantic City. N. J. Sponsorship Newark Branch.
June 15-18,	**1964—51st AES Annual Convention,** Sheraton-Jefferson Hotel, St. Louis, Missouri.
June 16-18,	**1964—Sixth Industrial Finishing Exposition,** St. Louis, Missouri.
June 28-July 1,	**1965—52nd AES Annual Convention,** Statler Hotel, New York, N. Y.
June 26-30,	**1966—53rd AES Annual Convention,** Hotel Fontainebleau, Miami, Florida. Dixie Regional Council, Sponsor. Southeastern Branch, Host.
June	**1967—54th AES Annual Convention,** Dallas, Texas

INTERSOCIETY

October 1-5,	**1961—The Electrochemical Society, Fall Meeting,** Hotel Statler, Detroit, Mich.
October 16-19,	**1961—2nd International Congress on Vacuum Technology,** Sheraton Park Hotel, Washington, D. C.
October 23-27,	**1961—43rd National Metal Exposition & Congress,** Cobo Hall, Detroit, Mich.
Nov. 26-Dec. 1,	**1961—American Society of Mechanical Engineers,** Winter Annual Meeting, Statler-HiltonHotel, New York, N. Y.
Jan. 30-Feb. 2,	**1962—Society of Plastics Engineers,** 18th Annual Technical Conference, Penn-Sheraton Hotel, Pittsburgh, Pa.
February 5-9,	**1962—American Society for Testing Materials,** Committee Week, Statler-Hilton Hotel, Dallas, Texas
March 19-23,	**1962—National Association of Corrosion Engineers, 18th Annual Conference, and Corrosion Show,** Kansas City Auditorium, Kansas City, Mo.
May 6-10,	**1962—The Electrochemical Society,** Spring Meeting, Statler-Hilton Hotel, Los Angeles, Calif.
June 24-29,	**1962—American Society for Testing Materials,** Annual Meeting and Apparatus Exhibit, Statler-Hilton Hotel, New York, N. Y.
Sept. 16-20,	**1962—The Electrochemical Society,** Fall Meeting, Hotel Statler-Hilton, Boston, Mass.

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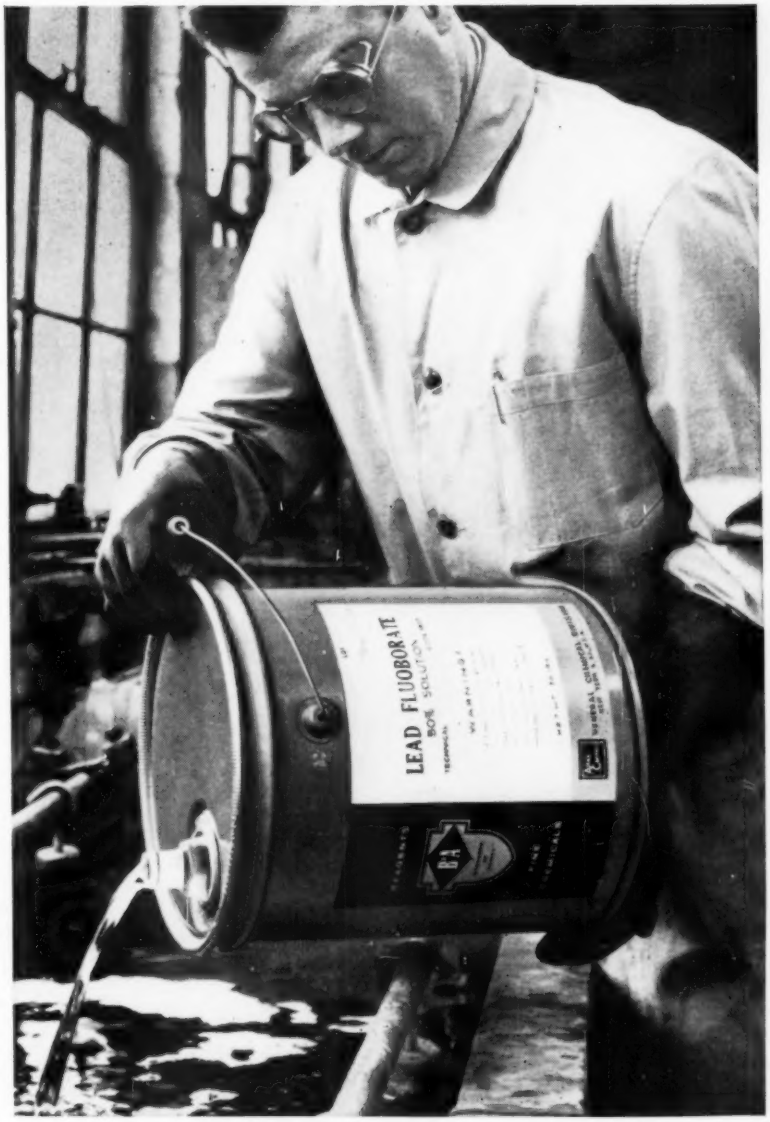

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